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PREFACE.

In 1891, Sir Thomas Elder, whose name is inseparable from Australian exploration, equipped an exceptionally well-organised party to explore the untrodden country in the interior of this continent. The expedition left Warrina, on the Great Northern Railway, 633 miles from Adelaide, with the intention of exploring the country to the westward lying between the parallels of 27° and 29°; however, the unfavorable character of the season prevented the instructions of the promoter from being carried out, and the only new country passed over was on the traverse from Cavenagh Range to Victoria Spring. On reaching Annean Station in the Murchison District of West Australia in January 1892, the party was recalled.

The Journal of this Expedition, written by the leader, Mr. David Lindsay, was published in 1893, under the auspices of the South Australian Branch of the Royal Geographical Society of Australia.

The publication of the Scientific Reports of the Expedition was undertaken by the Royal Society of South Australia; but the issue of Part 1 and Part 2 having exhausted the available funds of the Society the further publication of the Reports was abandoned. Now, after the lapse of three years, through the generosity of Mr. Robert Barr-Smith, who has defrayed the entire cost of the publication of Part 3, Vol. XVI., which was reserved for the Scientific Results of the Elder Exploring Expedition, is finally completed.

The Geological map forming part of this volume is based on the topographical survey made by the Leader of the Expedition and his Assistants, inserted on it are the chief locality-names and the position of each camp (indicated thus, ⊙ 39). The map will, therefore, serve as a reference for the geographical locations quoted in the text of this volume.

The liver-worts were forwarded, through Baron F. von Müeller, to Prof. Stephani for identification ; but beyond the intimation that all of the species, five in number, were diagnostically unknown, no report has reached me from that expert.

Among the Crustacea collected at Upper Arkaringa Creek in South Australia, the following two species have been reported on by Messrs. Spencer and Hall in the "Zoology of the Horn Expedition," 1895 :—*Apus australiensis*, Spencer & Hall, and *Eulimnadia rivolensis*, Brady.

EDITOR.

May 23, 1896.

VEGETABLE EXUDATIONS.

By J. H. MAIDEN, F.L.S., F.C.S.,

Curator Technological Museum, Sydney, and Botanist Forest Department, Sydney.

PREFATORY NOTE.

The vegetable exudations brought home by the Expedition consist of :—

One Manna *(Myoporum platycarpum)*.
Two Gums *(Acacia leiophylla* and *Brachychiton Gregorii)*.
Three Kinos *(Eucalyptus tessellaris, E. incrassata,* and *E. incrassata, var.)*.
Two Resins *(Callitris verrucosa* and *Xanthorrhœa Preissii)*.

The gums, kinos, and resins present no remarkable features. The manna is, however, a more interesting substance, and although it has been collected hundreds of times, and has been often brought under the notice of Australian scientific men, yet no one appears to have ascertained its composition. It proves to consist almost entirely of mannite, and its composition is practically identical with that of the ordinary commercial manna of Europe obtained from *Fraxinus Ornus*. This is the first time a true manna has been announced from Australia, as the so-called Eucalyptus-mannas are composed of sugars other than mannite. It would now be interesting to examine some barks and other Australian vegetable products for mannite.

Myoporum-manna is a perfect substitute for its European namesake, and when freshly exuded its colour is not objectionable.

MANNA.

Myoporum platycarpum, *R. Br.*

N.O. *Myoporineæ* : "Sandal-wood."

Collected 29th September, 1891, at Camp 65. Clayey sand. Collector's note : —

"This gum *(sic)* was collected partly off a small tree 20 feet high, and four inches in diameter, and is the one on which I noticed gum (manna, *J. H. M.*) oozing out, and partly from under it. The tree had been bleeding profusely, and for a long time, as there was a great deal of decaying gum (manna) round the

trunk. I believe the cause of bleeding to be insect-bores, but had not sufficient time to examine it closely, as my camel was very restive. The taste is sweet as sugar."

In spite of its sweetness, Mr. Helms informs me, that the natives were not partial to it, preferring the gum of *Acacia leiophylla;* probably because of its laxative property, and not from any objection to its sweetness, inasmuch as the blacks eat lerp and Eucalyptus-mannas, honey stored by bees, and also suck the honey-laden flowers of certain plants. It will be remembered that Sir Thomas Mitchell offered sugar to an aboriginal child, who spat it out with every manifestation of disgust, but the blacks usually do so with any edible to which they are unaccustomed.

That other natives (at least those of western New South Wales) do eat of this manna is borne out by the following statement by the late K. H. Bennett, in Proc. Linn. Soc., N.S.W., VII., 351. It is well known that Mr. Bennett's knowledge of such matters was both extensive and accurate.

"During the hot summer months another and totally different looking substance exudes from the trunks and branches of some of these trees in large quantities. This substance when freshly exuding from the tree resembles a thick froth, either pure white, and resembling snow, or of a pink or rose colour. These exudations assume various forms, and become solidified by exposure to a certain extent to the air. Sometimes they are in lumps as large as a man's hand, and sometimes in the form of stalactites over a foot long, as large as an ordinary candle, and gradually tapering to a point This substance is of a highly saccharine nature, with a peculiar sickly sweetness; it melts in the mouth like ordinary sugar; the natives are very fond of it, and either eat it, or by dissolving it in water make a kind of drink."

The sample of manna collected by the Expedition at first sight resembles a brownish earthy substance, *e.g.*, a marly soil containing much lime. On closer examination it is seen to have a pinkish tinge, while selected portions are quite white or cream-coloured.* It is vesicular in structure, soft and friable, sweetish and almost gritty to the taste. Should a demand for it for medicinal purposes spring up, it could be obtained quite pale coloured and pure, and in considerable abundance, if it were systematically collected as is the product of *Fraxinus Ornus.*

---

* In the district of Fowler Bay, the native name of the manna is "outeman," that of the sandal-wood "poolkerah;" according to Mrs. Richards the fresh manna is quite white, and is full of insects, but becomes discoloured with age.—EDITOR.

MICROSCOPICAL EXAMINATION.

When the manna is observed under a lens, slender, bright, radiating crystals are observed, principally in the hollows of the mass. When examined under the miscroscope, they are found to polarize in bright colours, principally blue, green, and purple. The crystals are rhombic prisms with brachypinacoid faces; these crystals extinguish parallel to the principal axis. When the mannite is removed, purified, and crystallized from water, transparent crystals are formed which do not polarize in colours, or only occasionally, and then very faintly.

CHEMICAL EXAMINATION.

If the manna be boiled in dilute alcohol, and filtered hot, the filtrate, on becoming cold, consolidates into a crystalline mass. If this be stirred with alcohol, filtered, and well washed with alcohol on the filter, the dark coloured substances contained in the manna will be removed, and also a portion of the mannite. If the residue be now dried, then dissolved in water, and crystallized from that medium, the crystals may be purified by two or three crystallizations from water and alcohol. When thus purified, the crystalline substance only reduces alkaline copper-solution to the very slightest degree on boiling, although the manna itself reduces Fehling's solution very readily.

The manna melts at 158-9° C., while the purified mannite melts at 160-1° C. A specimen of mannite freshly prepared from *Fraxinus*-manna melted, at the same time and under precisely the same conditions, at 161° C.

ESTIMATION OF GLUCOSE.

Two grams of the manna were dissolved in water, made up to 200 cc. It required 174 cc. to reduce 10 cc. of Fehling's copper-solution (10 cc. = 0·05 gramme glucose). The manna therefore contains 2·87 per cent. of a glucose.

Two grams of the same manna were dissolved in water, boiled with dilute hydrochloric acid for half an hour, and then made up to 200 cc. This solution required 148 cc. to reduce 10 cc. of Fehling's solution = 3·38 per cent. of a glucose after inversion, consequently we have 3·38 – 2·87 = ·51 per cent. of a sugar or sugars other than a glucose.

ULTIMATE ANALYSIS OF THE CRYSTALLINE SUBSTANCE FOUND IN THE MANNA.

The substance was purified as much as possible *without* the aid of animal charcoal. It was repeatedly crystallised from water and alcohol, and was eventually obtained almost white. The crystals are anhydrous. Analyses made 20th July, 1892.

Taken for analysis, 6·326 grains.

6·326 grains gave 9·01 grains CO_2 and
4·30 grains H_2O.

CO_2 = 9·01	= 2·457 C	= 38·84 %	= 3237 C
H_2O = 4·30	= ·478 H	= 7·556 %	= 7556 H
Oxygen, by difference	= 3·391 O	= 53·604 %	= 3350 O
6·326		100·000	

From these figures we may consider the formula to be = $C_6H_{14}O_6$.

From this analysis, and determinations of melting point, crystalline form, &c., there is no doubt that the substance is mannite.

A second combustion of the mannite was made, the figures obtained confirming the previous result. They are given here :—

6·345 grains were taken for analysis.
6·345 grains gave 9·11 grains CO_2, and
4·316 grains H_2O.

CO_2 = 9·110	= 2·485 C	= 39·16 %	= 326 C
H_2O = 4·316	= ·479 H	= 7·55 %	= 755 H
Oxygen, by difference	= 3·381 O	= 53·29 %	= 333 O
6·345		100·00 %	

$= C_6H_{14}O_6$ (mannite).

MISCELLANEOUS.

The manna contains—

3·5 per cent of moisture,
1·1 " ash,

a portion of which was dirt, as the manna is somewhat impure, as already stated.

The manna contains no tannic acid ; its contact with the bark and dark colour might lead one to expect at least a trace.

It only ferments in the slightest degree after two days' treatment with yeast.

QUANTITATIVE ANALYSIS OF THE MANNA (SUMMARY).

The manna was dissolved in water, filtered, alcohol and lead-acetate added, which precipitated a small portion of the substances in solution. After removing the lead by sulphuretted hydrogen, and evaporating to dryness, the residue was treated with boiling 90 per cent. alcohol ; this was dried and weighed. In this way 89·65 per cent. of mannite was found.

We may therefore conclude that picked samples of the manna from *Myoporum platycarpum* contain from 85 to 90 per cent. of mannite.

From the above results the composition of the manna may thus be stated :—

Mannite	= 89·65
A glucose	= 2·87
Other sugars	= ·51
Moisture	= 3·50
Ash with sand	= 1·10
	97·63
Substances removed by lead-acetate, and loss	2·37
	100·00

GUMS.

Acacia leiophylla, *Benth.*

N.O. *Leguminosæ* : "Yanwilli" of the natives.

Collected 25th October, 1891, on clay soil at the Fraser Range. Height of shrubs, 4-10 feet.

Mr. Helms informs me that this gum is largely used for food by the natives, and so highly is it esteemed by them that they were unwilling to part with even a small quantity of it. In Western Australia it has been recorded to yield a useful gum. In an official report it is stated that it "is recommended by the medical faculty for its strengthening properties," though it has no more claim to that recommendation than many other wattle-gums have.

This gum is a perfect substitute for gum-arabic, and would be valuable if obtainable in large quantities. It is readily and entirely soluble in cold water. It would require sorting for the market, as even in the small sample received there are three qualities, portions being quite brown and almost opaque, while other portions are colourless-transparent and yellowish-transparent respectively. The gum strongly resembles many specimens of wattle-gums I have examined from the western parts of New South Wales, *i.e.*, from arid country; the wattle-gums of inferior solubility being obtained from the coast districts, with comparatively high rainfall.

The chemical composition of the present sample hardly differs from that of gum-arabic. It contains 13·2 per cent. of water, 1·1 per cent. of ash, which consists principally of calcium carbonate with a trace of sulphuric acid, but no phosphoric acid.

For an account of the composition of Australian Acacia-gums, see my paper, "The Chemistry and Commercial Possibilities of Wattle-gums," Pharm. Journ. [3], XX., 869; 980 (1890).

BRACHYCHITON GREGORII, *F. v. M.*

N.O. *Sterculiaceæ*: "Kurrajong."

Sample 1.—Collected 13th September, 1891, at Camp 50, centre of the Victoria Desert. Granite formation.

Sample 2.—Collected 16th November, 1891, from trees on granite formation.

The properties and composition of this gum are identical with that of other gums from the same genus, and described fully in my paper, "Sterculia-gum: its similarities and dissimilarities to Tragacanth," Pharm. Journ. [3], XX., 381, to which the reader is referred. Briefly, the present sample resembles the runnings of a spermaceti candle. It is in vermiform and flaky pieces; most of them are white, but some of them are stained yellow and brown.

KINOS.

EUCALYPTUS TESSELLARIS, *F. v. M.*

N.O. *Myrtaceæ*: "Blood Gum."

Collected 15th August, 1891, at Camp 33, near Barrow Range. Sand on granite.

This kino has a sweetish odour, is of a burnt-sienna-brown colour in bulk, and, owing to its friable nature, it is in very small pieces. The powder is of a mahogany colour. It dissolves in boiling water, but deposits catechin on cooling. The solution (one gram to the litre) is turbid, and of a very pale orange-brown colour.

It was analysed 1st June, 1892*, with the following result: –

Tannic acid and catechin	88·35
Moisture	10·40
Ash	·50
Impurities (Ligneous matter, &c.)... ...	·75
	100·00

A determination of the tannic acid according to Lowenthal's process gave 68·5 per cent.

This kino belongs to my Turbid Group.† A description of a Queensland sample of kino of this species will be found in the paper referred to in the footnote. In comparing the two kinos (of *E. tessellaris*, p. 417 of paper quoted, and *E. terminalis*, p. 415), it will be observed how close is the similarity between *tessellaris*-

* In kinos it is always important to state the approximate dates of collection and analysis, as their composition alters with age.

† "The Examination of Kinos as an Aid in the Diagnosis of Eucalypts." Part III., The Turbid Group. J. H. Maiden in Proc. Linn. Soc., N.S.W. [2], VI., 389.

kino from the Barrow Range and the *terminalis*-kino. The appearances and the analyses are the closer now (July, 1892), as the *terminalis*-kino has aged nearly another year. This is a coincidence, yet there is nothing discordant in the two more varying results obtained from *tessellaris;* they simply show the amount of variation possible in two perfectly well authenticated kinos from the same species.

Eucalyptus incrassata, *Labill., var. a.*

N.O. *Myrtaceæ.*

Collected 1st October, 1891, at Camp 67. Clayey sand. Height of trees, 30 feet.

This kino belongs to my "Turbid Group." It is friable, and therefore in small pieces; it is of a dark sienna-brown colour, the powder being of a lighter tint. It is entirely soluble in hot water, but deposits catechin on cooling. When made up to one gram per litre, the liquid has a pale orange-brown colour, though with a rose tint

Its composition, determined 7th June, 1892, is as follows:—

Tannic Acid and catechin ...	84·18
Moisture	14·70
Ash	·40
Impurities	·72
	100·00

Lowenthal's method gave a tannic acid equivalent of 44·5 per cent.

The kino of this species has not been previously examined.

Eucalyptus incrassata, *var. b.*

"Mallee."

40 feet high. Collected 22nd October, 1891, at Fraser Range, in clayey sand.

This kino is bright-looking, friable, and with a colour resembling that of common garnets. Colour of powder raw-sienna. It is wholly soluble in hot water, catechin being deposited on cooling. The liquid (one gram to the litre) is turbid, and of a light reddish-brown colour, inclining to a rose tint.

Its composition may be stated as follows:—

Tannic acid and catechin ...	84·64
Moisture	14·60
Ash	·20
Impurities	·56
	100·00

It was analysed 1st June, 1892.

Determination of tannic acid by Löwenthal's method, 47·5 per cent.

This kino belongs to my "Turbid Group;" and contains a medium amount of catechin.

RESINS.

Callitris verrucosa, *R. Br.*

N.O. *Coniferæ*: "Pine."

Sample 1.—Collected on sand-hills at various places in the Victoria Desert. No date. Collector's note:—"This is the resin of tree with cones like enclosed, and different to earlier collected specimens."

A transparent colourless resin, having externally the powdery appearance characteristic of resins of this genus. It is entirely soluble in alcohol, and readily powders. Its composition and appearance in no way differ from that of the sandarach of commerce, for which it is a perfect substitute. For further information in regard to our indigenous *Callitris*-resins, see my paper, entitled "Australian and Tasmanian Sandarach" (Proc. Roy. Soc., Tasmania, 1889). The following additional note in regard to this species may be given:—"The resin of *C. verrucosa* was used to make firm the union (after lashing) of the hard-wood head to the reed, in the making of reed-spears by the aboriginals of Victoria. The resin was called by them bij-jin-ne." ("Aboriginals of Victoria," Brough Smyth, I., 306).

Sample 2.—Collected 3rd July, 1891, amongst granite rocks at Camp 14. Collector's note:—"Up to 30 feet, diameter 15 in. at base, but running up very conical. From trees and ground. The resin runs."

Hardly differs in appearance and behaviour from the preceding sample.

Xanthorrhœa Preissii, *Endl.* (probably).

N.O. *Liliaceæ*: "Grass-tree"—"Gnora" of the natives.

Collected 18th September, 1891, at Camp 55, Victoria Desert. Notes by collector:—"Sand hills. The trees had been burnt, and large masses of the gum were collected around the base with sand blown in while in the semi-liquid state. Some were near 15 feet high, and 18 inches in diameter."

This resin is in largish pieces of a dark purple-brown colour; it is very impure from the admixture of sand and vegetable débris.

Alcohol dissolves out 36 per cent. of a dark, rich-coloured resin, having much the appearance and behaviour of that derived from *X. arborea* under similar treatment.

When burned, 47·3 per cent. is removed, leaving 52·7 per cent. of impurity, chiefly sand. Under the microscope is is interesting to observe that particles have become very much abraded on the edges, confirmatory, of course, of the sand having been wind-blown.

For further particulars in regard to *Xanthorrhœa*-resins, see my paper on "Grass-tree Gum," Proc. Linn. Soc., N.S.W. [2]. v. 430 (1890), which includes some notes on the resin of the species under present reference.

I desire to acknowledge the valuable assistance I have received from my laboratory assistant, Mr. Henry G. Smith, in the examination of these exudations.

LEPIDOPTERA.

By OSWALD B. LOWER.

Taking the collection as a whole, it is exceedingly poor, and adds but little to our entomological fauna. This is the more to be regretted, as the opportunity for traversing the same ground may never occur again. A remarkable feature in the collection is the inclusion of several world-wide species, notably, *Heliothis armiger*, Hübn., and *Nomophila noctuella*, Sch., showing how these introduced (?) species adapt themselves to different localities and conditions. Another noticeable feature is the paucity of Œcophoridæ in the collection. This family is represented in Australia by at least 2,000 species—I have 230 species in my own collection, collected within 20 miles of Adelaide—and to find only *three* representatives in the collection is, to say the least, perplexing. It will also be noticed that the date of appearance of *Trictena labyrinthica*, Don., is very much at variance with the usual time. Most of specimens emerge in and around Adelaide during April and May, whereas those from the Interior were captured during October, at which time I have never observed them. In commenting on the general condition of the specimens received, I may say that the whole are in very fair order and, with the exception of those described as new, are taken at various periods both at Parkside and Blackwood. The collection, if it does nothing else, shows the distribution of the various species; but one would have thought to have seen more of the Western Australian forms. The season just closed has been a very poor one from an entomological point of view, so far as Adelaide and its environs are concerned, and considering the reports from the Interior, insect-life was probably at a premium during the progress of the Expedition.

The following comprise the species received:—

Heterocera.

SYNEMONIDÆ.

Synemon, *Doubleday*.

S. pyrrhoptera, *n. sp.* Only one specimen. A male of this fine species captured at Fraser Range, 14th October, 1891.

S. sophia, white *var.* One fine specimen. A female from Murchison district, February, 1892. This differs somewhat from the type, being more prominently marked with the white on the

underside, and one of the spots on the hindwing has an obscure whitish suffusion in it on the upperside. Otherwise the same as I take at Mount Lofty, S.A.

HEPIALIDÆ.

TRICTENA, *Meyrick.*

T. LABYRINTHICA, *Don.* Two male specimens at Fraser Range in October, 1891. As before mentioned, the time of capture is noticeable. (Also taken at Parkside).

ARCTIADÆ.

EARIAS, *Hübn.*

E. CHLORODES, *Meyr.* One female specimen. Cootanoorina, June. (Also taken at Parkside).

ANESTIA, *Meyr.*

A. OMBROPHANES, *Meyr.* One male from Victoria Desert in September. I think it is very probable that the female of this species is apterous, I have taken a good number, and have had several from various correspondents for identification; but have never seen a female.*

LIPARIDÆ.

TEARA, *Walker.*

T. EREBODES, *n. sp.* Seven specimens, all females, from Fraser Range, in October.

T. INTERRUPTA, *Walk.* One female specimen. Locality not given. (I have a male taken at Port Lincoln, S.A.).

DARALA, *Walker.*

D. MACROTA, *Meyr.* One fine male specimen of this species at Nilpena, in May.

D. OCHROPTERA, *n. sp.* One specimen. A male at Cootanoorina in June.

BOMBYCIDÆ.

DETOLINIA, —.

D. LANCEOLATA, *Walk.* Two specimens. One at Mount Squires, in August. One at Camp 10, June 28, 1891.

---

* Since writing the above I have obtained a female specimen from Melbourne, bred from the egg, the larva of which feeds on lichen dust, usually found on old posts. The imago, as anticipated, is apterous. For this information I am indebted to Mr. Ernest Anderson, of Toorak, Victoria, who has bred the species. 19-9-'92.

Noctuina.

DASYPODIA, *Guenée.*

D. SELENOPHORA, *Guenée.* One specimen at Forest Range, October ; in bad condition.

AGROTIS, *Hübner.*

A. INFUSA, *Boisduval.* One male. Fraser Range, October 7, 1891.

ORTHOSIA, *Trim.*

O. LUCASII, *Butler.* Two specimens. One at Nilpena in May, one at Cootanoorina, in June.

O. TORTISIGNA, *Walker.* One specimen, Cootanoorina, in June.

O. SPODIAS, *Meyrick.* One specimen, Cootanoorina, in June.

PRAXIS.

P. MARMORINOPA, *Meyrick.* One specimen, Cootanoorina, in June.

HELIOTHIS, *Ochs.*

H. LEUCATMA, *Meyrick.* Three specimens at Mount Squires and Victoria Desert in August.

H. ARMIGER, *Hübner.* Two specimens, Mount Squires, 28th August.

Geometrina.

MONOCTENIADÆ.

NEARCHA, *Meyrick*

N. BUFFALARIA, *Gn.* One male specimen, Mount Squires in August.

SELIDOSEMIDÆ.

OSTEODES, *Gn.*

O. PROCURATA, *Walker.* One male specimen, Mount Sir Thomas, in July.

CHLENIAS, *Gn.*

C. ARIETARIA, *Gn.* Two specimens, male and female, from Nilpena in May, and Cootanoorina in June respectively.

PYRALIDINÆ.

NOMOPHILA, *Hübner.*

N. NOCTUELLA, *Schiff.* Three specimens, Mount Squires and Victoria Desert, in August and September. This species is almost cosmopolitan.

TRITÆA, *Meyr.*

T. USTALIS, *Walker.* Seven specimens (extreme varieties) at Nilpena and Cootanoorina, in May and June.

XEROSCOPA, *Meyr.*

X. PHILONEPHES, *Meyrick.* One specimen, Cavenagh Range, in July.

HELLULA, *Gn.*

H. UNDALIS, *Fabr.* One specimen, Cootanoorina, June, 1891.

Tortricina.

TORTRICIDÆ.

CAPUA, *Steph.*

C. MELANOCROCANA, *Meyrick.* One specimen, in May, at Nilpena.

ŒCOPHORIDÆ.

EULECHRIA, *Meyrick.*

E. ACHALINELLA, *Meyr.* One specimen. Mount Squires, August 29th.

CÆSYRA, *Meyrick.*

C. OCELLARIS, *Meyrick.* One specimen. Victoria Desert, September.

MACROBATHRA, *Meyr.*

M. ALTERNATELLA, *Walker.* One specimen. Victoria Desert, in September.

HYPONOMEUTIDÆ.

ENDROSIS.

E. LACTEELLA, *H. S. (?)* One specimen, in bad condition, which appears to be this species. Cootanoorina, June.

PTEROPHORIDÆ.

TRICHOPTILUS, *Wlsm.*

T. CENTETES, *Meyr.* Six examples, at Arcoeillina Well, in May, 1891.

DESCRIPTIONS OF NEW SPECIES.

SYNEMON PYRRHOPTERA, *spec. nov.*

Male, 44 mm. Head, antennæ, and thorax dark fuscous, antennæ annulated with white. Club whitish beneath. Palpi white beneath, infuscated above. Legs fuscous-whitish. Abdomen ochreous-fuscous, whitish beneath. Forewings elongate-triangular, costa moderately arched, hindmargin bowed; dark fuscous, very irregularly irrorated with lighter fuscous and whitish scales; a large dark fuscous patch in disc before one-half, above middle, beyond which is an oblique suffused streak of pale reddish, centred with whitish, from costa at one-half to before anal angle;

two pure white transverse spots beneath costa at two-thirds, upper one the larger; an obscurely-indicated transverse row of darker spots from apex to anal angle, nearly parallel to hindmargin; cilia fuscous, with whitish tips. Hindwings scarlet, markings black; a broad irregular hindmarginal fascia, narrower at anal angle, from one-half of costa to anal angle, enclosing two spots of ground-colour, one below apex, and one beyond and near anal angle, the last hardly separated from ground-colour, inner margin broadly ochreous fuscous, cilia as forewings. Underside dark-fuscous, basal area strongly suffused with ferruginous; on oblique irregular wedge-shape streak of scarlet from immediately beneath costa at one-half, reaching half across wing; six obscure ovate transverse whitish spots, suffusedly edged with reddish-orange from near beneath apex to half across wing. Hindwings as forewings, a scarlet spot in disc, another beneath apex, paler, a third immediately beneath first, a fourth immediately beyond, and a fifth below and between fourth and fifth.

A distinct species well-characterised by the hindwings. The one specimen is not in the best condition, so that the description is a little loosely drawn up. The female may possibly be brighter coloured. One specimen, Fraser Range, October 14, 1891.

Teara erebodes, *spec. nov.*

Female, 42-50 mm. Head, thorax, abdomen, and legs dark fuscous, hairs of thorax yellowish tinged, tolerably erect. Abdominal segments and anal tuft orange, more pronounced beneath. Antennæ ochreous. Forewings elongate, costa nearly straight, hindmargin obliquely rounded; uniform dark fuscous, minutely irrorated with paler; cilia fuscous, with a blackish line at base. Hindwings with hindmargin rounded, slightly paler than forewings. Underside as upperside.

Seven female specimens; Fraser Range, in October. It is just possible the male will be found to be much lighter coloured, as is usual with the *Teara*.

Darala ochroptera, *spec. nov.*

Male, 55 mm. Head, thorax, abdomen and legs pale whitish ochreous; thorax fuscous-tinged beneath. Abdominal segments fuscous. Antennæ white, pectinations about 12. Forewings triangular, costa slightly sinuate, hindmargin strongly rounded, rather oblique, pale whitish ochreous, with fuscous markings; a small fuscous basal patch, a curved thick line from beneath costa at one-fourth to inner margin at one-third, darker anteriorly; a blackish longitudinal ovate discal spot at one-third, and another, transverse, beyond it at about one-half, centred with whitish, both above middle; a narrow fuscous line from two-thirds of costa to

two-thirds inner margin, strongly curved outwardly near costa, and nearly straight from discal dot; a broad fuscous suffusion immediately beyond this, posteriorly strongly margined with darker, leaving a clearly-defined line of ground-colour between the two lines: cilia pale ochreous. Hindwings as forewings, with hindmargin rounded, strongly haired with fuscous towards base; a moderate quadrate patch of brown hairs indicating discal dot; faint indications of lines of forewings; a fuscous strongly-dentate line from one-third of costa to one-third inner margin: cilia as forewings. Underside colour and markings as forewings, first line absent. Hindwings with two discal dots sharply centred with whitish. Allied somewhat to *D. ocellata*, Walk.

One specimen; Cootanoorina, in June.

COLEOPTERA.

By REV. T. BLACKBURN, B.A.,

Hon. Curator for Entomology, S. Aust. Mus.

The *Coleoptera* collected by Mr. Helms in the interior of Australia comprise a considerable number of species previously undescribed. There are very few brightly-colored species among them, and most of the new ones are closely allied to well-known forms. It is probably hardly safe to generalise positively on the strength of this material, for although Mr. Helms' abilities as a collector of *Coleoptera* are beyond suspicion, the season in which the expedition happened to be made was so exceptionally dry, and therefore unfavorable for the work of collecting, that it seems hardly likely any large proportion was obtained of the *Coleoptera* that occur in the district traversed. The family most plentifully represented in specimens is the *Curculionidæ*, by far the largest part of the specimens appertaining to the sub-families *Leptopsinæ* and *Amycterinæ*. Next to the *Curculionidæ* in respect of numbers come the *Lamellicornes*, and of these more than half belong to the obscure and extensive genus *Heteronyx*. No other family can be said to be more than sparingly represented. The prevalent type in the *Coleoptera* of this collection is distinctly south and south-western. The most interesting insect collected is a *Scaritid*, for which I find it necessary to propose a new generic name, and which I propose to call, in honor of Sir Thomas Elder, *Trichocarenum Elderi*.

CICINDELIDÆ.

TETRACHA.

T. Helmsi, sp. nov. Subtus piceo-brunnea, apicem versus testacea; supra viridis plus minusve purpureo-micans, mandibulis (apice excepto) labro palpis antennis pedibus et elytrorum apice testaceis; elytris antice fortiter minus crebre punctulatis postice lævigatis. Long., $6\frac{1}{2}$—8 l.; lat., $2\frac{4}{5}$—$3\frac{1}{5}$ l.

Very like *T. australis*, Chaud., but smaller, less nitid, with the testaceous apex of the elytra much smaller, the underside differently colored, the row of large punctures on the elytra near the suture scarcely marked, and the elytral puncturation considerably more sparse.

W. Australia; Murchison district.

T. pulchra, Brown. Lake Lefroy.

CARABIDÆ.

GIGADEMA.

G. eremita, sp. nov. Sat breve, sat latum ; nitidum ; aterrimum antennis apicem versus fulvo-pubescentibus ; capite magno pone oculos minus constricto, labro minus elongato sparsissime punctulato ; prothorace quam longiori (maris fere tribus partibus, feminæ minus quam duabus partibus) latiori, canaliculato, disco transversim strigato vix punctulato, partibus ceteris fortiter sat crebre punctulatis, angulis anticis rotundatis partem interjacentem sinuato-truncatam (maris sat fortiter, feminæ vix manifeste) superantibus, lateribus crenulatis fortiter rotundatis mox ante basin oblique fere rectis, basi late emarginata ; elytris striatis, interstitiis parum convexis puncturis sat magnis biseriatim sat crebre ornatis; femoribus anticis subtus ad basin angulatim dilatatis ; ligula in medio longitudinaliter planata, parte planata utrinque carinata (carinis retrorsum convergentibus). Long., 16—18 l. ; lat., 6 l.

The comparatively short wide form, the large head, and the deep coal-black colour of this species associate it with *G. Bostocki*, Cast., from which it may be at once separated by its much stouter and less-finely pointed mandibles, by its shorter labrum, and the very different sculpture of its elytra, the interstices of which are less flat and much more closely and evenly punctured; the punctures running (as in *Bostocki)* in two well-defined isolated rows down each interstice (except close to the margin, where they become more confused), but being very much stronger, and more closely and evenly placed in the rows. It is very likely to be the insect mentioned by Dr. Gestro (Ann. Mus. Gen., 1875, p. 28) as having been, in his opinion, mistaken by the Baron de Chaudoir for *G. Bostocki.*

The sexual differences in this species are very peculiar. I do not think there is any room for doubting that the two examples before me are conspecific, nor, of course, can I doubt that the example with the anterior tarsi subdilated and clothed beneath is the male. The other example, however, is the smaller one, and it has the narrower prothorax, the middle part of the front of which is more prominent than it is in the male. I notice that the apical dorsal segment in the male is obsoletely notched behind.

From *G. longipenne*, Germ., this species may be at once distinguished by, *inter alia*, its larger head, shorter labrum, ligula longitudinally flattened and carinate, shorter and broader form ; from *G. grande*, Macl., by the sides of its prothorax being crenulate and strongly sinuate behind ; from *G. titan* by its wider and

less parallel elytra, with interstices punctured in more regular rows.

Fraser Range.

G. mandibulare, sp. nov. Elongatum; parallelum; minus nitidum; piceo-nigrum, antennis apicem versus fulvo-pubescentibus; capite modico pone oculos modice angustato, labro sat elongato; prothorace quam longiori (feminæ dimidia parte, maris etiam magis) latiori, canaliculato, disco transversim strigato in medio lævigato, partibus ceteris punctulatis, angulis anticis rotundatis partem interjacentem sinuato-truncatam vix superantibus, lateribus crenulatis fortiter rotundatis mox ante basin oblique fere rectis, basi bisinuata; elytris striatis, interstitiis vix convexis minus fortiter sat crebre sat confuse punctulatis; femoribus anticis subtus ad basin angulatim dilatatis; ligula ut *G. eremitæ*.

Maris mandibulo sinistro perlongo falciformi, dextro multo breviori intus ante apicem dente magno armato.

Feminæ mandibulis brevioribus, dextro apicem versus haud dentato. Long., 17—22 l.; lat., $6\frac{1}{5}$—$6\frac{1}{2}$ l.

Distinct, *inter alia*, from *G. Bostocki* and *eremita* by its elongate parallel form and pitchy tone of colour; from *longipennis* by its very differently shaped ligula; from *grande*, Macl. (according to Mr. Bates' remarks on that species in E.M.M., Nov., 1891, though not according to Dr. Gestro's figure in Ann. Mus. Gen., 1875), by its prothorax not differing much in shape posteriorly from that of *titan*, *longipenne*, &c.; from *grande*, Macl. (as figured by Dr. Gestro), by its prothorax much less produced in front; from *titan*, Thoms. (according to Mr. Bates and to Queensland specimens in my collection which I have regarded as that species, but not according to Dr. Gestro's figure), by the very differently shaped mandibles of its male; from *intermedia*-Gestro, by its very elongate form; and from the other recognise ably described species of *Gigadema* by the central part of the disc, of its prothorax devoid of puncturation.

The two specimens described above, which I believe to be male and female of one species, present slight differences, which I regard as accidental variations. In the female the lævigate portion of the disc of the prothorax is considerably smaller than in the male, moderately close puncturation occupying all the surface except the central third part. In the female, moreover, the elytral interstices are more closely and confusedly punctured than in the male, each interstice bearing about four irregular rows of punctures; while in the male the puncturation in many places falls into three, or even only two, fairly-defined rows. The strongly bisinuate base of the prothorax seems to be a notable character, and no other species of the genus that I have seen has

mandibles like this; the sickle-shaped left mandible of the male being almost as long beyond the labrum as the maxillary palpus, and the right mandible bearing a very strong tooth about halfway between its apex and the front of the labrum.

Everard Range.

TRIGONOTHOPS.

T. flavofasciata, Chaud. Barrow Range.

PHILOPHLŒUS.

P pygmæus, sp. nov. Sat depressus; pubescens; ferrugineus; prothoracis disco abdominis lateribus et elytris fuscis, horum lateribus et vittis singulis dorsalibus (postice late interruptis et apicem versus in sutura conniventibus) testaceis; prothorace quam longiori fere duplo latiori, antice modice emarginato, postice obsolete lobato, ad latera utrinque 2-setoso, latitudine majori longe ante medium posita, lateribus antice sat rotundatis vix angulatis postice subsinuatim convergentibus, angulis posticis obtusis; elytris sat confertim sat subtiliter punctulatis, leviter striatis. Long., $2\frac{1}{2}$ l.; lat., $1\frac{1}{5}$ l.

Maris tarsorum intermediorum articulis nullis subtus squamuloso-papillatis.

The characters of the intermediate tarsi in the male associate this species with *P. luculentus*, Newm., &c., in the last section of the genus, but its style of markings resembles that in *P. australis*, Dej., and others in the first and second sections; it is very much smaller than any previously-described *Philophlæus*, in this respect resembling *Agonocheila*, but its facies and structure of palpi are those of a *Philophlæus*. The pattern on its elytra is much like that in *P. angulatus*, Chaud., but having the discal vittæ narrower and abbreviated in front, as well as widely interrupted behind. The punctuation of its elytra is evidently less fine and less close than in *P. angulatus*, Chaud., but is finer and closer than in *P. eucalypti*, Germ., or *australis*, Dej.

Fraser Range.

P. ornatus, sp. nov. Sat depressus; pubescens; ferrugineus; elytris fuscopiceis, lateribus sat late et vittis singulis (antice valde dilatatis) testaceis, his in quinta parte apicali deficientibus; prothorace quam longiori duplo latiori, antice sat emarginato, postice leviter lobato, ad latera utrinque circiter 5-setoso, latitudine majori paullo ante medium posita, lateribus sat rotundatis, angulis posticis fere nullis; elytris confertim subtiliter punctulatis, leviter striatis, interstitiis parum convexis. Long., 5 l.; lat., $2\frac{1}{5}$ l.

Maris tarsorum intermediorum articulo 1° apicem versus, 2° toto, 3° sparsissime, squamuloso-papillatis.

This species seems to hover between the first and second sections of the genus, the third joint of the intermediate tarsi of the male being nearly devoid of papillæ beneath, but not quite. If it be regarded as a member of the first section, the elytra bearing a pattern together with the fine close puncturation of the same, the number of prothoracic setæ and the normally-shaped sutural apex of the elytra will distinguish it from others of the section except *P. monticola*, Blackb., which *inter alia* has a less transverse prothorax, the hind angles of which are less rounded off. As a member of the second section this species would be distinguished by the same characters (disregarding the form of the sutural apex) from all others of the section except *P. puberulus*, Chaud., which is not really described by its author, but is only compared with *australis*, Dej. (and in one respect with *Eucalypti*, Germ.); but that species seems to have the prothorax narrower, and with hind angles less rounded off, and the elytral vittæ of very different shape.

In the present insect the prothorax scarcely differs from that of *P. laticollis*, Blackb., except in being more deeply emarginate in front. The discal vittæ of its elytra are so wide in front that they occupy the whole base except a little slight infuscation round the scutellum, and extend backwards gently narrowing to near the apex of the elytra, where they do not meet. The lateral pale margin of the elytra is exceptionally wide.

Victoria Desert.

TRICHOCARENUM (gen. nov.).

Eutomæ valde affinis; corpus passim setis longissimis gracilibus vestitum; caput supra oculum puncturis magnis 4 utrinque instructum; humeri nulli; elytra puncturis magnis in seriebus sinis (præter seriem marginalem) instructa; prosternum antice irregulariter, et femora antica subtus biseriatim confertim, crasse punctulata.

Apart from the characters mentioned above, I do not find any characters to distinguish this genus from *Eutoma*, but the differences specified appear to me so numerous and strongly marked, that it would be misleading to refer to *Eutoma* the insect on which I found this new genus. The four large punctures above each eye (which are placed longitudinally, and are separated from the eye by a very deep sulcus), the close series of large punctures arranged along both margins of the under surface of the front femora, and the strongly punctulate prosternum as well as the double row of large punctures running down each elytron (in addition to a very close row of large punctures in the lateral sulcus of both prothorax and elytra) will at once separate this genus from all scaritid genera heretofore characterised. On the

front tibiæ the external inferior ridges are placed much as in *Eutoma* or certain *Carena* (e.g., *anthracinum*, Macl.). The external ridge has about four distinct teeth above its large terminal one; the inferior ridge consists of about six teeth.

T. Elderi, sp. nov. Elongatum; nitidum; nigrum setis fulvis vestitum, antennis (articulis basalibus exceptis) brunneo-pubescentibus et setis brevibus vestitis; capite elytris latitudine æquali quam prothorax nonnihil angustiori; hoc quam longiori vix latiori; elytris quam prothorax plus quam duplo longioribus. Long., 11 l.; lat., $2\frac{1}{2}$ l.

At a casual glance the head seems to be about the same width as the prothorax, and the elytra narrower than either; by measurement the proportions are as given above. The frontal sulci are deep, nearly straight (behind their front angle), and divergent hindward, reaching well behind a line joining the hind margins of the eyes; they are connected behind by a distinct transverse sulcus. The orbits of the eyes are swollen behind, and the eyes do not project beyond them. The antennæ are filiform and moderately long and stout. The prothorax has a well-defined impressed dorsal line, and is impunctate, except in the lateral sulci, where there is a close-set row of punctures, each bearing a long erect seta; its surface is obsoletely wrinkled transversely; its front is nearly straight, the angles, however, projecting slightly forward; its sides are nearly straight from the front hindward (and slightly convergent) till they round off without a distinct angle into the base. The extreme basal part of the elytra is thickly pitted with large setiferous punctures, of which a row runs hindward nearly to the apex, about half-way between the suture and lateral margin and another row (reaching the apex) between the inner row and the lateral margin, which bears a close-set row of punctures; these latter are not setiferous, but it is possible the example before me is abraded; the general surface is almost lævigate. The legs are quite like those of a *Eutoma* except in being much clothed with setæ, and in the generic character mentioned above.

I have named this most interesting insect after Sir Thomas Elder.

Victoria Desert.

CARENUM.

C. rugatum, Blackb. Victoria Spring.

CALLISCAPTERUS.

C. speciosus, Sloane. Victoria Desert.

PLATYTHORAX.

P. transversicollis, Chaud. Upper Murchison River. (This species

was known to me only by description, but I feel no doubt of the correctness of my identification. The Baron de Chaudoir did not know the precise habitat of the type.)

PHILOSCAPHUS.

P. costalis, Macl. Upper Murchison River.

SCARAPHITES.

S. laticollis, Macl. Boorabin.

CLIVINA.

C. Australasiæ, Bohem. Murchison District.

C. Helmsi, sp. nov. Sat angusta; sat cylindrica; nitida; subtus obscure ferruginea, supra picea, elytrorum lateribus suturaque rufescentibus, antennis palpis capite antice pedibusque testaceis; capite inter oculos sat profunde longitudinaliter sulcato; prothorace antrorsum sat angustato, postice utrinque lineatim impresso, quam latiori fere longiori; elytris sat fortiter punctulato-striatis, striis apicem versus obsoletis, stria 4ª basi extrorsum contorta; tibiis anticis externe dentibus 4 instructis, dente summo parvo, 2° sat magno, 3° sat gracili cylindrico (apice obtuso) ceteros longitudine superanti. Long., 3 l.; lat., $\frac{4}{5}$ l.

This species may be placed in the "section" of M. Putzeys' "Revision Gen. des Clivinides" in which the author places *C. Australasiæ*. It is very distinct by the following characters in combination:—Head with an extremely strong longitudinal sulcus between the eyes, suture lateral margins and epipleuræ of elytra reddish testaceous, legs entirely testaceous with only the knees faintly infuscate.

Cootamoorina.

GNATHAPHANUS.

G. aridus, sp. nov. Sat nitidus; niger vel piceus, ore palpis antennarum basi pedibus (nonnullis exemplis femoribus picescentibus) et corpore subtus (hoc piceo notato) rufis vel rufo-testaceis; prothorace transverso antice quam postice vix angustiori, canaliculato, utrinque ad basin foveolato (foveis obscure punctulatis), lateribus rotundatis, angulis posticis rotundatis; elytris profunde striatis, interstitiis fortiter convexis, 3° 5° 7° que (hoc postice solum) puncturis seriatim ornatis; mento haud distincte dentato. Long., 4—5 l.; lat., $1\frac{3}{5}$—$1\frac{4}{5}$ l.

A very distinct species; its mentum without a distinct median tooth, together with elytra bearing three rows of punctures, will

distinguish it from all the hitherto described Australian *Gnathaphani*.

Everard Range, &c.

G. Adelaidæ, Cast. Nilpena, &c.

SARTICUS.

S. obscurus, sp. nov. Sat robustus; nitidus; niger, antennis palpis pedibusque piceo-rufescentibus; prothorace leviter transverso, antice quam postice vix angustiori, leviter canaliculato, utrinque ad basin foveolato, lateribus et angulis posticis rotundatis; elytris elongato-ovalibus, fortiter striatis, striis obscure crenulatis, interstitiis sat planis (3° punctis 3 seriatim ornatis); metasterno ad latera et segmentis ventralibus sat fortiter punctulatis. Long., $4\frac{1}{2}$ l; lat., $1\frac{4}{5}$ l.

The small size of this *Sarticus* will distinguish it from all previously described, except *cyclodernus*, Chaud., and *ischnus*, Chaud. Its general form will separate it from both the latter. Compared with *cyclodernus* it is of more robust appearance, with elytra less narrowed in front, and consequently seeming more massive and parallel. *Ischnus* is described as "of more slender and elegant form than *cyclodernus*," and its prothorax is said to be "much narrower behind" (the prothorax of the present species being if anything wider behind). From *cyclodernus* this insect also differs by the presence of a row of three punctures on the third interstice of the elytra.

Everard Range.

S. brevicornis, sp. nov. Minus convexus; nitidus; niger, antennis apicem versus palpisque ferrugineis; prothorace quam longiori fere tertia parte latiori, postice quam antice fere angustiori, leviter canaliculato, utrinque ad basin foveolato, lateribus et angulis posticis fortiter rotundatis; elytris ovalibus, modice striatis, striis vix manifeste punctulatis (lateralibus subobsoletis), interstitiis sat planis (3- punctur is 4 -harum tribus anterioribus striam 3^{am} tangentibus—ornato); metasterno ad latera vix manifeste punctulato; antennis gracilibus brevibus, prothoracis basin haud attingentibus; prothorace antice in medio vix manifeste marginato. Long., 8 l.; lat., 3 l.

Though this species has altogether the facies of *Sarticus*, its comparatively slender and short antennæ, and the anterior prothoracic margin almost failing in the middle distinguish it strongly from all its previously-described congeners. It should be placed near *S. Aubei*, Cast., although its elytral striæ are not quite so absolutely impunctate as in that species. Its prothorax is much like that of *S. discopunctatus*, Chaud., but with even

more strongly rounded and more narrowly margined sides. The head is a little narrower and more elongate than that of *S. discopunctatus*, and the seventh and eighth elytral striæ are much more distinct, though considerably fainter than the rest of the striæ. The punctures of the basal ventral segment are very well defined.

Everard Range.

PLATYNUS.

P. marginicollis, Macl. Nilpena; also Everard Range.

DYTISCIDÆ.

BIDESSUS.

B. bistrigatus, Clk. Most of the examples of this species differ from the type in having the fuscous markings on the elytra very sharply defined—consisting of two blotches placed one behind the other on the apical half of each elytron. In one example the two are united on each elytron into a single large blotch, which is perfectly black.

ANTIPORUS.

A. Gilberti, Clk. Upper Arkaringa.

NECTEROSOMA.

N. penicillatus, Clk. Everard Range.

LANCETES.

L. lanceolatus, Clk. Boorabin.

RHANTUS.

R. pulverosus, Steph. Nilpena, Barrow Range, &c.

COPELATUS.

C. lividus, Shp. Upper Arkaringa.

ERETES

E. australis, Er. Boorabin.

HYDROPHILIDÆ.

HYGROTROPHUS.

H. nutans, Macl. Everard Range.

HISTERIDÆ.

SAPRINUS

S. cyaneus, Fab. Widely distributed.

NITIDULIDÆ.

THALYCRODES.

T. (Thalyera) australis, Germ. Mount Squires.

DERMESTIDÆ.

DERMESTES.

D. cadaverinus, Fab. Widely distributed.

LAMELLICORNES.

ONTHOPHAGUS.

O. Murchisoni, sp. nov. Minus nitidus; niger, antennis rufo-piceis clava testacea, corpore subtus pedibusque setis fulvis sparsim vestitis; capite haud transversim carinato, postice obsolete punctulato, antice et in clypeo genisque transversim ruguloso, clypeo antice triangulariter emarginato; prothorace æquali vix manifeste punctulato; elytris leviter catenulato-striatis, interstitiis planis lævigatis; pygidio sparsim leviter nec subtiliter punctulatis; sternis latera versus sat fortiter punctulatis; tibiis anticis externe 4-dentatis.

Maris (?) tibiis anticis gracilibus, dentibus minus fortibus.

Feminæ (?) tibiis anticis minus gracilibus, dentibus fortioribus.

Long., $3\frac{4}{5}$—$4\frac{1}{5}$ l.; lat., $1\frac{9}{10}$—$2\frac{1}{5}$ l.

Extremely like *O. muticus*, Macl., differing from it chiefly by the well-defined triangular emargination of the front of the clypeus. There is no trace whatever of transverse carinæ on the head, and the prothorax (except under a high power) appears quite devoid of punctures. On either side of the prothorax there is a tubercle, but scarcely a fovea. The smaller examples have the front tibiæ more slender than the larger ones, and less strongly toothed; they are no doubt the males. *O. inermis*, Macl., also resembles the present insect, but it also differs in the front of the clypeus being entire, and moreover it is a more nitid species.

Murchison River.

TROX.

T. Castelnaui, Lansb. Various localities.
T. Elderi, Blackb. Victoria Desert.
T. euclensis, Blackb. Nilpena, &c.
T. Tatei, Blackb.(?-*gigas*, Har., var.)

LIPAROCHRUS.

L. rufus, sp. nov. Late ovalis; glaber; rufo-ferrugineus; nitidus; capite fortiter ruguloso; prothorace fortiter transverso, a basi ad apicem angustato, postice quam antice fere duplo latiori, in disco sparsius subtiliter (puncturis transversis) latera versus crebrius magis crasse punctulato, lateribus minus late deplanatis, angulis anticis modice productis parum acutis, posticis rotundatis, margine basali

integro; elytris striatis (vix geminatim), interstitiis sat planis maris (?) juxta strias utrinque subtiliter feminæ (?) minus subtiliter sat æqualiter punctulatis, lateribus crenulatis tibiis anticis externe dentibus acutis 3 armatis. Long., $3\frac{1}{2}$ l.; lat., 2 l.

The dark ferruginous red colour of this species seems to be constant. It is near *L. politulus*, Macl., but is a much wider insect, and shorter in comparison with its width, its prothorax more narrowed in front, and less strongly punctured, its front tibiæ more sharply dentate externally, &c. Compared with *L. geminatus*, Westw., apart from colour, it is a little more elongate, with the discal punctures of the prothorax differently shaped (each puncture being a short, deep transverse scratch), and the depressed lateral margins of that segment much narrower, and with the elytral striæ much less distinctly geminate, and the interstices evidently less flat. The colour, size, and geminate striation of the elytra, in combination with the nitid glabrous surface, will distinguish it from all its described congeners except *L. oblongus*, Har., which seems from its description and name to be a much more elongate insect.

Murchison District.

OCNODUS, *Burm.*

The following two species may be, I think, referred to this genus, which, however, does not seem to me very clearly characterised by its author, who, I should judge, had seen only the female. If I should be incorrect in this determination the species in question would have to be regarded as forming a new genus near *Ocnodus*. The principal discrepancy is in connection with Burmeister's statement that the club of the antennæ is "small." In the *male* before me the lamellæ of the club are longer than the preceding five joints of the antennæ together; in an example which I believe to be its female, they are scarcely shorter than the preceding five joints; in the other species (of which I have not seen a male) the lamellæ forming the club of the antennæ in the female are as long as the preceding four joints together. In a third species which I have described under the name *O. lugubris* (Proc. Linn. Soc., N.S.W., 1891, III.), the lamellæ of the female are as in the latter. The antennæ of all these insects, however, are extremely like those of *Mœchidius* in all respects, and as Burmeister calls the club in *Mœchidius*, "small," also, I presume, it is a mere question of what one means by "small."

The two species described below are extremely like each other, so like that I should hesitate to separate them if it were not for a complete difference in the relation *inter se* of the clypeus and

labrum in the one and the other species, analogous to the difference that distinguishes the third section of *Heteronyx* (in my revision of the genus Proc. Linn. Soc., N.S.W., 1889 and 1890) from the first section. In the first species described below *(O. spinicollis)* the suture between the clypeus and labrum is very strongly arched in an angular fashion, so that the summit of the labrum rises towards the level of the upper surface of the clypeus (though without very nearly reaching it), while in the other *(O. fallax)* the suture is much nearer being straight, so that the summit of the labrum is placed very much further below the level of the upper surface of the clypeus. In *O. lugubris*, Blackb., the structure of these parts is as in *O. fallax*.

The punctures of these insects are not, I think, truly squamigerous, though to a superficial glance they may appear so, but the bottom of each puncture, under a strong lens, appears to be unevenly convex, or to consist of a convexity or granule intersected by one or two fine striæ.

N.B.—Since writing the above I have determined to refer to *Ocnodus* a third species, for which I had intended proposing a new generic name. On full consideration, however, although I still think it probable that it may eventually be found desirable to separate it generically, I cannot overlook the possibility that further research may produce intermediate forms such as to prove the structural differences merely specific. This third species differs from the other two principally by the different relation to each other of the labrum and clypeus (in *O. spinicollis* and *fallax*, and also in *O. lugubris*, the perpendicular front face of the clypeus is much elongated, so that the distance from the front of upper surface of the clypeus to the mouth organs is very considerable, but in *O. ferrugineus* the front face of the clypeus is much shorter, the line of separation between the clypeus and labrum being almost as in *O. fallax)*, the vestiture of the under surface of the tarsi (consisting in *O. spinicollis* and *fallax* of a thick mass of setæ at the apex of each joint as specified by Burmeister in his generic diagnosis, while in *O. ferrugineus* this structure is much less strongly defined), and in the upper surface of the body of *O. ferrugineus* being somewhat closely sprinkled with short whitish recurved setæ, which are wanting in all its congeners except *O. decipiens*, Burm., the real type of the genus.

I may add that *O. spinicollis* and *fallax* differ from all the other species yet described by the absence of setæ in combination with sharp-produced hind angles of the prothorax, *O. lugubris* by the former character without the latter, and that *O. ferrugineus* may be at once distinguished from *O. decipiens*, Burm., by its much smaller size and non costate elytra.

O. spinicollis, sp. nov. Femina. Robustus; modice elongatus;

convexus; nitidus; subglaber; obscure piceus, antennis palpisque dilutioribus; capite (præsertim clypeo) crebre rugulose, prothorace paullo minus crebre haud rugulose, elytris crebre crasse vix squamose, pygidio (hoc planato fortiter carinato) crasse rugulose, corpore subtus fortiter nec crebre, punctulatis; puncturis vix manifeste squamigeris; clypeo antice sinuato-truncato, anguste reflexo-marginato, ante oculos vix dilatato; prothorace quam longiori fere duplo (postice quam antice perparum) latiori, lateribus leviter bisinuatis, margine antico late fortiter bisinuatim emarginato, basi late rotundatim lobata, angulis anticis acutis fortiter productis, posticis rectis (certo adspectu fortiter spiniformibus); elytris inæqualiter interrupte obsolete costatis; coxis posticis ad latera quam segmentum ventrale secundum haud longioribus; tibiis anticis extus 3-dentatis. Long., 5 l.; lat., $2\frac{2}{5}$ l.

Barrow Range.

O. fallax, sp. nov. A præcedenti differt statura majori, colore rufescenti, pygidio minus crebre punctulato, clypeo antice æqualiter rotundato a labro sutura fere recta diviso.

Maris pygidio convexo vix manifeste carinato, segmenti ventralis quarti margine postico in medio reflexo. Long., $5\frac{1}{4}$—6 l.; lat., $2\frac{1}{2}$—$3\frac{1}{5}$ l.

Murchison district.

O. ferrugineus, sp. nov. Ferrugineus, antennarum clava pallide flava; nitidus; fortiter punctulatus, puncturis singulis setulas singulas pallidas ferentibus; elytris haud costatis; clypeo antice subemarginato fere truncato, ad latera utrinque oblique truncato; tibiis anticis extus juxta apicem 2-dentatis. Long., $2\frac{4}{5}$ l.; lat., 1 l.

The prothorax is about half again as wide as long, strongly convex, and even above; at its widest behind the middle, the sides strongly rounded, the front (which is rather strongly emarginate, with sharp angles) considerably narrower than the base, the hind angles obtuse, but not rounded; the base moderately and widely lobed in the middle. The elytra are at their widest near the apex, where they are about a quarter wider than the prothorax; they are evidently wider at their base than the base (but not than the widest part) of the prothorax; the setæ of the elytra run in rows, the interstices being transversely rugulose.

Victoria Spring.

HETERONYX.

H. fulvohirtus, Blackb. Murchison River.
H. piceus, Blanch. Murchison River.

H. severus, sp. nov. Minus elongatus, sat convexus ; postice vix dilatatus ; sat nitidus ; obscure ferrugineus, antennis palpisque testaceis ; pilis brevibus sparsim vestitus ; capite confertim rugulose, prothorace fortiter vix crebre, elytris crebre sat fortiter subsquamose, pygidio (hoc capillis erectis vestito) obscure sat crasse, punctulatis ; clypeo brevi, antice late vix emarginato, ante oculos utrinque leviter prominulo sutura clypeali fortiter carinata ; prothorace quam longiori (et postice quam antice) circiter dimidio latiori, lateribus sat rotundatis ante medium vix subsinuatis, basi sat rotundata vix bisinuata, angulis anticis minus productis vix acutis, posticis rotundatis (superne visis certo adspectu subrectis) ; elytris haud striatis (stria suturali excepta), vix transversim rugulosis ; tibiis anticis extus fortiter acute 3-dentatis ; labro clypeum haud superanti ; antennis 9-articulatis ; coxis posticis ad latera quam metasternum fere dimidio breviori-bus ; unguiculis subbifidis. Long., $4\frac{1}{5}$ l. ; lat., $2\frac{1}{5}$ l.

Var. colore sat pallide ferrugineo.

The apex of the basal piece of the claws is more sharply produced than in most species with appendiculate claws, but scarcely sufficiently so to entitle the claws to be called truly bifid. The emargination (distinct though slight) of the clypeus with other characters places this species in my tabulation (Proc. Linn. Soc. N.S.W. 1888, pp. 1328-31) beside *H. satelles*, Blackb., which, however, is a much smaller insect, with more coarsely punctured elytra, clypeal suture non-carinate, &c. Independently of the slight emargination of the clypeus, this species is much more really allied to *H. victoris*, Blackb., and *viator*, Blackb., from the former of which it differs *inter alia* by its prothorax being scarcely even bisinuate (in *victoris* the same is distinctly lobed) behind, while it differs from both by its less closely and less strongly punctulate elytra, its evidently wider clypeus, and its strongly carinate clypeal suture.

Murchison District.

H. alienus, sp. nov. Modice elongatus ; minus convexus ; postice vix dilatatus ; sat nitidus ; piceo-ferrugineus, antennis palpisque testaceis ; pilis sat elongatis vestitus ; clypeo crebre rugulose capite postice magis crasse minus crebre, prothorace fortiter sat sparsim, elytris pygidioque (hoc longitudinaliter carinato) fere ut prothorax, punctulatis ; clypeo brevi antice late emarginato, ante oculos minus dilatato, sutura clypeali carinata ; prothorace quam longiori (et postice quam antice) fere duplo latiori, lateribus fortiter rotundatis, basi leviter bisinuata, angulis anticis minus prominulis sat acutis, posticis rotundatis (superne visis certo adspectu sub-

rectis); elytris haud striatis, transversim manifeste rugulosis; tibiis anticis extus 3-dentatis; labro clypeum haud superanti, antennis 9-articulatis; coxis posticis ad latera quam metasternum multo brevioribus; unguiculis subbifidis. Long., $2\frac{4}{5}$ l.; lat., $1\frac{1}{2}$ l.

The claws are not unlike those of the preceding species, but their apical piece is shorter and more slender in proportion.

In the tabulation (Proc. Linn. Soc. N.S.W. 1888, pp. 1328-31) this species falls beside *H. darlingensis*, Blackb., from which its carinate clypeal suture, stronger elytral puncturation, &c., readily distinguish it. It is in some respects like the preceding species in miniature, but is very much more coarsely punctured throughout. Compared with *H. satelles*, Blackb., it is a less elongate, and much more coarsely sculptured insect.

Upper Murchison River.

H. lobatus, Blackb. Fraser Range.

H. fervidus, sp. nov. Modice elongatus; sat convexus; postice vix dilatatus; sat nitidus; ferrugineus, antennarum clava testacea; pilis brevibus adpressis et alteris elongatis erectis sat sparsim vestitus; capite crasse rugulose, prothorace duplicitur (subtiliter et crasse) minus crebre, elytris squamose sat leviter, pygidio sparsim vix fortiter, punctulatis; clypeo antice fortiter emarginato, ante oculos sat fortiter dilatato, sutura clypeali impressa angulata; prothorace quam longiori et postice quam antice fere duplo latiori, lateribus modice arcuatis, basi leviter bisinuata, angulis anticis minus prominulis minus acutis, posticis rotundatis; elytris obsolete inaequaliter substriatis hic illic transversim rugatis; tibiis anticis extus fortiter acute 3-dentatis; labro clypeum anguste fortiter superanti; antennis 8-articulatis; coxis posticis ad latera quam metasternum vix brevioribus; unguiculis appendiculatis. Long., $5-6\frac{1}{3}$ l.; lat., $2\frac{2}{5}-3\frac{1}{3}$ l.

The elytra are not genuinely striated, but their surface is in places longitudinally convex (in some examples more noticeably than in others) which gives some appearance of striation; the nearest approach to a defined stria is close to the suture.

This species belongs to the aggregate which I have called "Group V.," and which falls in section III. of *Heteronyx*. The species of that group are tabulated in Proc. Linn. Soc., N.S.W., 1889, pp. 141-5. This species must be placed (in the tabulation) beside *H. nasutus*, Blackb., on p. 141; it is very nearly allied to *nasutus*, having an exactly similar clypeal structure and "trilobed outline;" but is a considerably larger insect, with its prothorax much more narrowed anteriorly; its elytra also differ in their puncturation being quite of the kind called "squamose"

(while in *nasutus* the elytral punctures are well defined and isolated), and in being pseudo-striate.

Murchison District.

H. decorus, sp. nov. Modice elongatus; minus convexus; postice vix dilatatus; sat nitidus; obscure ferrugineus, antennis palpisque dilutioribus; sparsim fulvo-pubescens; capite confertim rugulose, prothorace fortiter subcrebre, elytris squamose sat crebre nec subtiliter, pygidio fere ut prothorax, punctulatis; clypeo antice late leviter emarginato, ante oculos minus dilatato, sutura clypeali subtili leviter arcuata; prothorace quam longiori (et postice quam antice) plus quam dimidio latiori, lateribus modice arcuatis, basi vix bisinuata, angulis anticis minus prominulis sat acutis, posticis rotundatis; elytris vix obsolete substriatis (stria subsuturali leviter impressa), vix transversim rugatis; tibiis anticis extus fortiter minus acute 3-dentatis; labro clypeum leviter minus late superanti; antennis 8-articulatis; coxis posticis ad latera quam metasternum sat brevioribus; unguiculis appendiculatis. Long., $5\frac{3}{5}$ l.; lat., $2\frac{7}{10}$ l.

The sculpture of the elytra being deep and somewhat close has a rough appearance, but the roughness is not conspicuously transverse. This species belongs to the same group (V.) as the preceding two. In the tabulation (cited above) it falls beside *cygneus*, Blackb., and *Fraserensis*, Blackb., is closely related, differing from the former by its much larger size, the short basal point of its hind tarsi, &c., from the latter *inter alia* by the completely rounded-off hind angles of its prothorax. The relation to each other of clypeus and labrum are almost as in *Fraserensis*, but the part of the labrum visible as the middle lobe of the "trilobed outline" of the head is evidently narrower in proportion to the lateral lobes.

Murchison District.

H. Fraserensis, sp. nov Minus elongatus, sat convexus; postice leviter dilatatus; subnitidus; ferrugineus; pilis subtilibus adpressis et nonnullis erectis sparsim vestitus; clypeo confertim rugulose, capite postice quam clypeus magis crasse paullo minus crebre, prothorace subsparsim, elytris squamose sat crebre sat fortiter, pygidio minus fortiter minus crebre, punctulatis; clypeo antice vix emarginato late fere truncato ante oculos extrorsum haud producto; prothorace quam longiori circiter dimidio (postice quam antice vix dimidio) latiori, lateribus leviter arcuatis, basi bisinuata vix lobata, angulis anticis acutis modice productis, posticis fere rectis vix retrorsum productis; elytris haud striatis vix transversim rugulosis; tibiis anticis extus fortiter acute 3-dent-

atis; labro clypeum sat late superanti; antennis 8-articulatis; coxis posticis ad latera quam metasternum parum brevioribus, quam segmentum ventrale secundum sat longioribus; unguiculis appendiculatis. Long., 5 l.; lat., $2\frac{1}{2}$ l.

This species belongs to my section III., group V., sub-group II. (vide Proc. Linn. Soc., N.S.W., 1889, tabulation pp. 141—145), and in the tabulation would fall alongside *H. cygneus*, from which it differs by its much larger size, darker colour, more coarsely punctulate elytra, and wider more robust build; on the underside the ventral segments are considerably more sparsely punctulate, especially in the middle; the basal joint of the hind tarsi is considerably shorter, scarcely exceeding half the length of the second joint.

Victoria Spring and Fraser Range.

H. cribriceps, sp. nov. Minus elongatus; sat convexus; postice vix dilatatus; subnitidus; piceo-ferrugineus, antennis palpisque vix dilutioribus; supra fere glaber; capite confertim rugulose, prothorace leviter vix crebre, elytris sparsius subfortiter vix squamose, pygidio subtilius sat crebre, punctulatis; clypeo antice vix obsolete emarginato, ante oculos vix dilatato, sutura clypeali obsoleta; prothorace quam longiori plus quam dimidio (postice quam antice vix dimidio) latiori, lateribus leviter arcuatis postice (superne visis) sinuatis basi vix bisinuata, angulis anticis modice productis minus acutis, posticis rotundatis (superne visis subrectis); elytris vix obsolete substriatis, leviter transversim rugulosis; tibiis anticis extus fortiter parum acute 3-dentatis; labro clypeum vix superanti; antennis 9-articulatis; coxis posticis ad latera quam metasternum parum brevioribus; unguiculis bifidis. Long., 4—$4\frac{1}{5}$ l.; lat., $2\frac{1}{5}$—$2\frac{2}{5}$ l.

The clypeus has a well-defined elevated margin all across its front, which is only very widely (and scarcely distinctly) emarginate.

This is one of the few species of *Heteronyx* which seem to to oscillate between Sections II. and III. in my arrangement of the genus, the labrum rising fully to the level of the clypeus, but scarcely protruding above it. However, as, from a certain point of view, the head has some feeble appearance of a "trilobed outline," or rather of its curved outline being narrowly bulged out in the middle, I think it is best placed in Section III.; and if so placed it will fall in Group VI., which is tabulated in Proc. Linn. Soc., N.S.W., 1889, pp. 426-8. In that tabulation its place will be beside *H. rotundifrons*, Blackb., to which it appears to me genuinely allied, although differing from it much by the close, even puncturation of its head, the much finer and feebler

punctuation in general, the well defined external hind angle of its hind coxæ, the presence of pseudo-striation on its elytra, &c.

Upper Murchison River.

H. siccus, sp. nov. Modice elongatus; sat convexus; postice leviter dilatatus; subnitidus; brunneo-ferrugineus, antennis palpisque testaceis; supra pilis brevibus suberectis parum crebre vestitus; clypeo confertim rugulose, capite postice sat crasse minus crebre, prothorace leviter sparsius nec subtiliter, elytris squamose sat crebre, pygidio fortius sat sparsim, punctulatis; clypeo antice truncato, ante oculos haud dilatato, sutura clypeali distincta recta; prothorace quam longiori fere duplo latiori, antice parum angustato, lateribus sat arcuatis postice (superne visis) vix subsinuatis, basi vix bisinuata, angulis anticis modice productis sat acutis, posticis rotundatis (superne visis subrectis); elytris haud striatis, transversim rugulosis; tibiis anticis extus fortiter acute 3-dentatis; labro clypeum late leviter superanti; antennis 9-articulatis; coxis posticis ad latera quam metasternum vix brevioribus; unguiculis bifidis. Long., $3\frac{3}{5}$ l.; lat., $1\frac{4}{5}$ l.

The raised margin of the clypeus is not continuous across the front. The "trilobed outline" of the head is very feebly developed, appearing as a slightly-trisinuate curve, the middle lobe not very much narrower than the lateral ones.

This species belongs to the group in which I have placed the preceding one, but its hind coxæ of about the same length as the metasternum refer it to a different part of the tabulation of that group. Its place is on page 126 (loc. cit.), beside *H. incola*, Blackb., from which it differs *inter alia* by the much-less close punctuation of its head behind the clypeal suture, and the form of the hind angles of its prothorax, which when viewed from above appear almost right angles, whereas in *H. incola*, they are quite rounded-off from all points of view.

Murchison District.

H. Helmsi, sp. nov. Minus elongatus; sat convexus; postice leviter dilatatus; minus nitidus; ferrugineus, antennis palpisque testaceis; sparsim subtiliter pubescens; capite confertim rugulose, prothorace confertim subtiliter, elytris confertim subtiliter squamose, pygidio subtilius minus crebre, punctulatis; clypeo antice truncato, ante oculos extrorsum haud producto; prothorace quam longiori plus quam dimidio (postice quam antice dimidio) latiori, lateribus sat arcuatis, basi fere æqualiter rotundata vix bisinuata, angulis anticis obtusis vix productis, posticis rotundato-obtusis; elytris vix obsolete striatis; tibiis anticis extus bidentatis; labro clypeum late fortiter superanti; antennis 9-articulatis;

coxis posticis ad latera quam metasternum haud brevioribus, quam segmentum ventrale secundum multo longioribus; unguiculis appendiculatis, parte apicali quam basalis paullo breviori. Long., 4 l.; lat., $2\frac{1}{10}$ l.

This species belongs to the last group of *Heteronyx* (having labrum overtopping the plane of the clypeus, the antennæ 9-jointed, and the claws appendiculate). It belongs to that portion of the sub-group characterised as having the head and prothorax not densely clothed with long erect hairs, the hind coxæ not or little shorter than the metasternum, and the puncturation of the upper surface more or less close, fine, and even. In my tabulation of the species presenting these characters (Proc. Linn. Soc. N.S.W., 1889, pp. 665 and 666) it is a little difficult to make this insect fit satisfactorily, as it does not quite agree with "H. middle lobe of trilobed outline narrowest" or "HH. middle lobe widest," as the three lobes are about equal. As, however, the middle lobe in H. is *a good deal* narrower than the others, and in HH. not much wider than the others there will be no fear of confusing the present species with any of those under H., and it will be better to apportion it to HH. (p. 666), altering "wider" (line 6) into "not narrower," and then distinguishing it from *laminatus*, Blackb., by its front tibiæ having only two teeth externally.

Victoria Spring and Fraser Range.

H. furvus, sp. nov. Sat elongatus; sat convexus; postice dilatatus; sat nitidus; setis brevibus sat crebre vestitus; rubro-ferrugineus, antennis palpisque dilutioribus; capite crebre sat fortiter ruguloso; prothorace subtilius sat crebre, elytris subtiliter minus crebre, pygidio sparsim subtiliter, punctulatis; clypeo antice truncato ante oculos angulatim dilatato, sutura clypeali sat profunde impressa recta; prothorace quam longiori plus quam dimidio (postice quam antice dimidio) latiori, lateribus modice arcuatis, basi vix bisinuata, angulis anticis modice productis acutis, posticis rotundatis; elytris vix obsolete substriatis certo adspectu subtiliter granulatis; tibiis anticis extus dentibus magnis 2 et supra dente parvo armatis; labro clypeum late subfortiter superanti; antennis 9 articulatis; coxis posticis ad latera quam metasternum haud brevioribus; unguiculis appendiculatis. Long., $4\frac{4}{5}$ l.; lat., $2\frac{3}{10}$ l.

The raised margin of the clypeus is scarcely traceable in the middle of the front. The "trilobed outline" of the head is fairly well defined, the three lobes subequal.

This species belongs to the same group of *Heteronyx* as the preceding. In the tabulation *(loc. cit.)* its place is on p. 667

beside *collaris*, Blackb., with which, however, it has little real alliance, and from which it may be distinguished among many other characters by the basal joint of its hind tarsi being very much shorter than the second joint. Its real alliance is certainly with *agrestis*, Burm., *elongatus*, Blanch., &c., forming the aggregate "C." (at end of page 666) in my tabulation, from all of which it may be distinguished by its much less close punctuation. In the example before me the propygidium is entirely exposed, but I judge this to be the result of some artificial inflation.

Murchison District.

H. longulus, Blackb. ? The condition of this example forbids its its positive identification.

COLPOCHILA.

C. deceptor, Blackb. Mount Squires.

ISODON.

There is an example of this genus from the Murchison District. The nomenclature of the genus presents difficulties (owing to the insufficiency of the descriptions of the named species) which I have been unable to overcome.

PHYLLIOCEPHALA.

P. nigro-hirta, Blackb. Victoria Spring.

CRYPTODUS.

C. caviceps, Westw. Murchison District.

SEMANOPTERUS.

S. minor, Blackb. Murchison District.

BUPRESTIDÆ.

MELOBASIS.

M. Elderi, sp. nov. Tota æneo-virescens ; sat nitida ; subtus et in capite sparsim albido-pubescens ; capite plano sat crebre sat fortiter subrugulose punctulato ; prothorace quam longiori fere duplo (postice quam antice quarta parte) latiori, nullo modo canaliculato, ad basin in medio fovea impresso, sat fortiter sparsius (latera versus crebre) punctulato, lateribus fere rectis, margine antico sinuatim emarginato, basi bisinuata, angulis posticis sat acutis retrorsum directis ; elytris vix striatis, inæqualiter (latera versus magis æqualiter) sat subtiliter seriatim punctulatis, interstitiis sparsim (quam series vix minus fortiter) punctulatis et hic illic obscure convexis ; lateribus postice denticulatis ; prosterno antice declivi ; corpore subtus fortiter punctulato. Long., 6 l. ; lat., $2\frac{1}{5}$ l.

An obscure looking species of greenish æneous colour, bearing much general resemblance to *M. nervosa*, Boisd., but without the elytral costæ of that insect, and having the prothorax more transverse, with its sides straighter, and its greatest width *at* the base, &c.

Fraser Range.

M. sordida, Blackb. Fraser Range.

MERIMNA.

M. atrata, Hope. Victoria Desert.

NEOCURIS.

N. cærulans, Fairm. Fraser Range.

JULODIMORPHA.

J. Bakewelli, White. Murchison District.

STIGMODERA.

S. Burchelli, L. and G. Murchison District.
S. longicollis, Saund. Upper Murchison River.
S. hostilis, Blackb. Murchison District.
S. cittata, Saund. Victoria Desert.
S. atricollis, Saund. A short series of examples taken in the Victoria Desert seems to me to be referable to this species in spite of a degree of variation that to a casual glance certainly appears incompatible with such an identification. Scarcely two specimens in the series are quite alike. The extreme form measures only $3\frac{3}{4}$ l. in length, and the pale colouring on the elytra is whitish-yellow, the markings and sculpture being not much different from the typical form of *atricollis*, except in the apical black colouring of the elytra, and the post-median fascia being very wide. I think this form may perhaps be conveniently named, and I shall call it "var. *deserti*." The other examples are of varied size, up to 5 l. in length, and in all of them (except one, the largest) the three spots in front of the elytra are united into a fascia, which, however, does not reach the lateral margins. In some of them the oblique emargination at the sutural apex of the elytra is extremely reduced in size, but is never quite absent; the apical spine is well developed in all. The colour gradually through the series approaches that of typical *atricollis*. I have been much puzzled by this insect, and have been very unwilling to call it *atricollis*, but in spite of misgiving on the point, much careful study has failed to bring to light any constant character to distinguish it specifically.
S. Elderi, sp. nov. Modice elongata; minus depressa; fere glabra; flava, capite viridi macula magna flava ornato,

prothorace macula magna obscure viridi, elytris fasciis 2 altera antemediana latera haud attingenti prope latera antrorsum producta, altera postmediana integra ad latera retrorsum producta) parte apicali quinta et sutura a fascia antemediana retrorsum cyaneo-nigris, scutello cyaneo, prosterno ad basin metasterni et abdominis maculis nonnullis antennis pedibusque cyaneis; capite æquali sat fortiter punctulato; prothorace quam longiori (et postice quam antice) paullo plus quam tertia parte latiori, sat fortiter vix crebre (in medio paullo minus crebre minus fortiter) punctulato, antice leviter sinuatim emarginato, postice vix bisinuato, lateribus leviter arcuatis, angulis anticis subacutis posticis acute rectis; elytris punctulato-striatis, basi subrectis, apice singulatim fortiter trispinosis, lateribus postice haud denticulatis, interstitiis sparsim fortius punctulatis antice subplanis postice convexis, corpore subtus sparsim leviter (prosterno medio magis fortiter) punctulato. Long., $5\frac{1}{2}$ l.; lat., $1\frac{4}{5}$ l.

The dark mark on the prothorax occupies the greater part of the surface. Its shape may be roughly described as resembling that of the bust of a human figure with the head and the arms truncated, the neck reaching to the front margin of the segment. The part, on each elytron, of the antemedian fascia bears a remarkable resemblance to the shape of a boot standing on (but not quite reaching) the lateral margin.

The markings and colours of the undersurface are scarcely distinguishable from those of *S. octospilota*, Lap. The upper surface, however, is very differently marked from that of *octospilota*, the general form is more elongate and narrow, the head is not longitudinally sulcate, the two external (of the three) spines at the apex of each elytron are long and acute, &c., &c.

Victoria Desert.

AGRILUS.

A. hypoleucus, L. & G. Fraser Range.

ELATERIDÆ.

AGRYPNUS.

A. Mastersi, Macl. Murchison District.

MONOCREPIDIUS.

M. nitidulus, Cand. Fraser Range.

MACROMALOCERA.

M. sinuaticollis, Blackb. Nilpena, or thereabouts.

RHIPIDOCERIDÆ.

RHIPIDOCERA.

The collection contains a single female example (taken at Cootinarina) of this genus. I cannot satisfactorily identify it with any species known to me, but even if it be of an undescibed species it would be undesirable to found a new species on a female.

MALACODERMIDÆ.

HELCOGASTER.

A single example was taken at Mount Squires. It is not in satisfactory condition for determination.

DASYTES.

D. Squiresensis, sp. nov. Minus elongatus; sat dense griseo-pubescens; aeneus, femorum apice et tibiis rufo-testaceis; sat crebre minus fortiter subrugulose punctulatus; antennis prothoracis basin vix attingentibus. Long., $1\frac{3}{5}$—2 l.; lat., $\frac{3}{5}$—$\frac{7}{10}$ l.

Maris antennis intus leviter serratis, segmento ventrali penultimo arcuatim emarginato.

Feminae antennis minus serratis, articulis 6° 8° que quam 5us 7us 9us que multo angustioribus, segmento ventrali penultimo simplici.

The colour is greenish-brassy; in some examples the base of the tarsi and some, or all, of joints 2-4 of the antennæ are red. I do not observe any character inconsistent with a place in *Dasytes*, unless it be that the tarsi are a little stouter and less elongate than in most species of the genus. Apart from size and colour, this insect bears a good deal of resemblance to *D. niger*, Fab. Compared with that species, the present one is somewhat less elongate and much more closely and strongly punctured.

Mount Squires.

D. Helmsi, sp. nov. A praecedente differt statura multo minore, pedibus antennisque totis nigris, maris segmento ventrali penultimo late subconcavo postice vix emarginato. Long., 1—$1\frac{1}{5}$ l.; lat., $\frac{1}{2}$ l. (vix).

This species is extremely like the preceding in miniature, but the differences specified above seem, I think, inconsistent with its being a mere variety.

D. nigricans, Hope. Victoria Spring and Fraser Range.

CLERIDÆ.

ZENITHICOLA.

Z. sosius, Chevr. Murchison District.

ELEALE.

E. Reichei, Spinola. The insect which I believe to be this species, and which I have seen from other localities in Western Australia, was taken by Mr. Helms at Mount Squires. I do not think I can be mistaken in my identification, although M. de Spinola does not refer to a character that certainly seems worthy of note, viz., the arrangement of the whitish hairs on the pro-thorax in the form of a fascia. In all other respects the specimen before me agrees well with the description. The insect seems to be extremely variable in size, the smallest I have seen being less than 3 l. long; the largest 6 l.

NECROBIA.

N. rufipes, De Geer. Everard Range.

BOSTRYCHIDÆ.

XYLOPERTHA.

X. ridua, Blackb.? This species was described from a unique specimen taken near Port Lincoln. The example of *Xylopertha* taken by Mr. Helms at the Barrow Range appears not unlikely to be the corresponding female, and the original type a male. When I described *X. ridua*, I took it to be a female, on account of its not presenting any of the strong sexual characters that I found in the male of its ally, *X. mystica*: although it did not either agree satisfactorily with the *female* of *X. mystica* in sexual characters. The examination of this example from the Barrow Range (which agrees perfectly in sexual characters with the female of *X. mystica*, but in other characters seems very near to, if not conspecific with, the type of *X. ridua*) suggests a doubt as to the sex of the type of *X. ridua*. At any rate, it would not be safe to regard this specimen as distinct specifically without having both sexes of it, or of *X. ridua*, for examination.

BOSTRYCHUS.

B. jesuita, Fabr. Murchison District.

TENEBRIONIDÆ.

HOPATRUM.

H. Elderi sp. nov. Modice elongatum; modice convexum; vix nitidiusculum; piceo-nigrum, labro testaceo, antennis palpis pedibusque obscure ferrugineis; setis brevibus fulvis vestitum; capite minus lato, cum prothorace sat crebre ruguloso, lateribus ab oculis antrorsum divergentibus magis longe quam oculi caverna longitudo; prothorace quam longiori plane (postice quam antice haud plane) duplo latiori,

nullo modo canaliculato, antice profunde emarginato, postice fortiter bisinuato, latera versus late deplanato, latitudine majori ad basin posita, lateribus a basi ad apicem vix arcuatim (juxta apicem magis arcuatim) angustatis, angulis anticis acutis longe ultra oculos productis, posticis sat acutis manifeste retrorsum directis, elytris ad basin quam prothoracis basin haud latioribus, crebre subtiliter granulatis sat fortiter striatis, striis puncturis sat magnis instructis, interstitiis æqualibus antice sat planis postice leviter convexis; tibiis anticis gracilibus. Long., 5 l.; lat., $2\frac{2}{5}$ l.

The distinctive characters of this species seem to be, head narrow, the clypeus dilating (but only very gently) forward from the eyes for a greater distance than the distance from the front to the base of the ocular cavity (in most species of *Hopatrum* the sides of the clypeus are *strongly* dilated from the eye), base of prothorax not narrower than the base of the elytra, anterior tibiæ only gently dilated (very much less strongly than in the European *H. sabulosum*, L.).

Murchison District.

H. longicorne, sp. nov. Ovale; minus convexum; alatum; subnitidum; piceum, antennis pedibusque plus minusve rufescentibus; setis brevibus fulvis vestitum; capite minus lato, cum prothorace elytris que sat fortiter sat crebre nec rugulose punctulato, lateribus nullo modo angulatis; prothorace quam longiori tribus partibus (postice quam antice circiter dimidio) latiori nullo modo canaliculato, antice minus fortiter emarginato, postice bisinuato, lateribus vix explanatis sat arcuatis, latitudine majori paullo pone medium posita, angulis anticis vix productis, posticis sat acutis; elytris punctulato-striatis, interstitiis planis, humeris obliquis; antennis sat elongatis prothoracis basin attingentibus. Long., $3\frac{3}{5}$ l.; lat., $1\frac{4}{5}$ l.

It appears to me very doubtful whether I am justified in not proposing a new generic name for this insect which differs from *Hopatrum* in its comparatively long antennæ, and in the structure of its prothorax. Its antennæ and prothorax are, in fact, those of a *Cestrinus*. The head differs from the head of both *Hopatrum* and *Cestrinus* by the sides of the clypeus being dilated laterally only a little beyond the outline of the eyes. The elytral epipleuræ and tarsi are those of a *Hopatrum*. I do not think the species can be referred to any of the genera that have been described near *Hopatrum*. The anterior emargination of the clypeus is very deep.

Fraser Range.

PLATYDEMA.

A female example of this genus was found at the Barrow Range. It does not seem to appertain to any described species, but it would not be well to describe it without having seen its male.

PTEROHELÆUS.

P. nitidiusculus, Macl.? This species is known to me only by the description. The example taken by Mr. Helms at Victoria Spring is smaller than the type (long., $4\frac{1}{3}$ l.), but otherwise agrees with Sir W. Macleay's description.

P. bullatus, Pasc. Nilpena, or thereabouts.

HELÆUS.

H. aridus, sp. nov. Late ovalis; subnitidus; glaber; niger, lateribus foliaceis vix rufescentibus, corpore subtus pedibus antennisque brunnescentibus; prothoracis lateribus foliaceis obsolete minus crebre granulatis, disco cornu valido conico armato; elytrorum disco sat crebre sat fortiter punctulato et granulis sat fortibus seriatim instructo, lateribus foliaceis haud punctulatis confuse sat fortiter granulatis, margine reflexo verticali obscure ruguloso; subtus elytrorum marginibus foliaceis minus crebre obsolete punctulatis. Long., $15\frac{1}{2}$—$16\frac{1}{2}$ l.; lat., $9\frac{1}{2}$—$10\frac{1}{2}$ l.

The granules on the elytra are variable; in some examples they form seven well defined rows confused only near the front of the elytra, in others some of these rows are interrupted, in others they are confused with granules placed on the interstices, so that there seem to be a large number of ill-defined rows. The granules of the row next the suture on either side are very closely placed in front, where they form a quasi-costa. This species seems to me to be best distinguished by the perfectly vertical wide reflexed margin of both prothorax and elytra which is opaque, obscurely rugulose, and almost devoid of any continuous longitudinal furrow; viewed from the side it is seen to be of almost perfectly even width from the front angles of the prothorax almost to the apex of the elytra. A study of this external (more or less erect) margin of the prothorax and elytra appears to me to yield very valuable results in the determination of the species of the extremely difficult group which Sir W. Macleay made the first section of *Helaus*. The present species is also characterised by the quite strongly punctulate disc of its elytra in contrast with the impunctulate foliaceous margins. In some examples the apical ventral segment is much more acuminate behind than in others; probably this difference is sexual.

It is possible that this insect is identical with that which Sir W. Macleay regarded as *H. princeps*, Hope, but if so I am con-

vinced that Sir W. Macleay was mistaken in his identification of it. It is, I think, impossible that Mr. Hope could have described the species before me as having "six elevated punctured lines on the disc of each elytron."

Nilpena.

II. debilis, sp. nov. Late ovalis; nitidus; glaber; niger, corpore subtus pedibus antennisque brunnescentibus; prothoracis lateribus foliaceis sparsim distincte granulatis, disco cornu valido conico armato; elytrorum disco sparsim minus fortiter punctulato et granulis sat fortibus seriatim instructo, lateribus foliaceis obsoletissime punctulatis confuse sat fortiter granulatis, margine reflexo verticali vix ruguloso; subtus elytrorum marginibus foliaceis minus crebre obsolete punctulatis. Long., 13½ l.; lat., 9 l.

Very like the preceding, but considerably smaller and much more nitid, with the puncturation of the elytra manifestly finer and less close. The reflexed margin of the prothorax and elytra is evidently less elevated, so that viewed from the side it looks narrower; moreover that of the prothorax is very manifestly narrower than that of the elytra.

Exact habitat not specified, but from date of capture it extends from Arkaringa Valley to Everard Range.

II. lubricus, sp. nov. Late ovalis; nitidus; glaber; brunneus, abdomine piceo; prothoracis lateribus foliaceis leviter punctulatis disco cornu valido compresso armato; elytrorum disco minus crebre subtilius punctulato et granulis paucis seriatim instructo, lateribus foliaceis obsoletissime punctulatis confuse sat fortiter granulatis, margine reflexo deciviter inferiori (hoc prothoracis verticali longitudinaliter concavo); subtus elytrorum marginibus foliaceis crebre minus obsolete punctulatis. Long., 16 l.; lat., 10½ l.

Apart from colour-differences (which may not be constant) this species is much more nitid than either of the preceding two, and its elytra are punctured like those of *II. debilis*; the underside of the foliaceous margins (especially of the elytra) are very much less obsoletely punctured than in either of the preceding two; the reflexed margin of the prothorax is erect, but that of the elytra is inclined outward; looked at from the side, the reflexed margin of the prothorax narrows from the middle, both forward and hindward, and is continuously concave along all its length: while that of the elytra is strongly narrowed towards the apex (this appearance is caused by its becoming nearly horizontal behind), and is declivous in such fashion as to be somewhat underneath the elytra, its lower edge being quite sharply cariniform.

Murchison district.

H. ingens, sp. nov. Late ovalis; opacus; glaber, niger, corpore subtus pedibusque brunnescentibus; prothoracis lateribus foliaceis sparsim minute granulatis disco cornu valido conico armato; elytrorum disco confuse minus sparsim punctulato et obsoletissime quadricostato (costa externa quam ceteræ paulo fortiori et granulis conicis sat validis armata), sutura fortissime carinata, lateribus foliaceis sat crebre sat fortiter granulatis, margine reflexo fere verticali; subtus elytrorum marginibus foliaceis crebre obsolete punctulatis. Long., 14—15 l.; lat., 9—10 l.

An exceptionally opaque species. Viewed from the side, the reflexed margin of both prothorax and elytra appears vertical and very little rugulose, with the lower edge marked by a very strong longitudinal carina, as in *H. lubricus*. The strong convexity of the disc of the elytra and the comparative flatness of their foliaceous margins give this species a distinct appearance; owing to this, if it be viewed from the side, the upper outline of the reflexed margin seems almost to bisect the insect, so that the top of the elytra seems nearly as high above the said line as the metasternum is below it; while in all the preceding three species, if they be viewed similarly, the corresponding line seems very much higher, so that the top of the elytra is much nearer than the metasternum to it. Of previously-described species of this section of *Helæus* (*i.e.*, Section I. of Sir W. Macleay's Revision), *H. colossus*, De Brême, is the only non-nitid species having the elytral disc minutely and confusedly granulate; in that, however, the foliaceous margins of the elytra are marked with large scattered punctures, whereas in *H. opacus* they are strongly granulate. Although this species was not taken by the Elder Expedition, it seems convenient to describe it here as being a species from Central Australia closely allied to the preceding three.

Central Australia; McDonnell Ranges.

SARAGUS.

S. tricarinatus, sp. nov. Brevis; sat parallelus; minus convexus; minus nitidus; glaber; capite prothoraceque crebre minute punctulatis; hoc quam longiori (et postice quam antice) fere duplo latiori, a basi antrorsum arcuatim angustato, obsolete canaliculato, lateribus late explanatis, marginibus haud reflexis vix incrassatis; elytris obsolete sat crasse nec rugulose (nonnullis exemplis vix manifeste) punctulatis, acute tricostatis (sutura haud elevata), costis longe ante apicem abbreviatis, spatio suturali late depresso; tibiis anticis ad apicem extus haud dentiformibus. Long., 6 l.; lat., $3\frac{3}{5}$ l.

An extremely distinct species with a general resemblance to

S. emarginatus, Guér., but with the elytra flat between the two carinæ nearest to the suture and the elytra parallel as in *S. convexicollis*, Macl. (which, however, is a very much larger and more elongate species).

Everard Range.

HYPAULAX.

H. orcus, Pasc. Fraser Range.

ADELIUM.

A. simplex, sp. nov. Elongatum ; minus nitidum ; supra æneum, subtus nigrum, tibiis apicem versus et tarsis totis læte fulvo-pubescentibus ; capite minus inæquali sat fortiter sat crebre nec rugulose punctulato ; prothorace quam longiori fere tribus partibus (postice quam antice tertia parte) latiori, vix canaliculato, haud ruguloso, subtiliter vix crebre punctulato et puncturis magnis paucis impresso, antice sat fortiter postice leviter emarginato, lateribus sat fortiter rotundatis sat explanatis pone medium haud sinuatis, angulis posticis obtusis ; elytris postice modice acuminatis, fortiter striatis, striis inæqualiter punctulatis, interstitiis convexis æqualibus, angulis humeralibus obtusis nec rotundatis, lateribus minus arcuatis ; antennis filiformibus sat elongatis, articulo 3° quam sequentes 2 conjuncti sublongiori. Long., $7\frac{3}{5}$ l. ; lat., 3 l.

An elongate but somewhat robust species, with elytra very little wider than the prothorax. The regular striation of the elytra, their evenly convex interstices and the comparatively slight inequality of the punctures in the striæ, are somewhat unusual characters. The interstices of the elytral striæ are punctured only very feebly and sparsely.

In M. Blessig's subdivision of *Adelium* this species would be associated with *A. caraboides*, Kirby, &c. ; but it does not seem to be very near any previously described species.

Victoria Desert.

CHALCOPTERUS.

C. cupripennis, Hope. Fraser Range.

C. eremita, sp. nov. Elongato ovalis ; viridis certo adspectu aureo- vel purpureo-micans, corpore subtus antennis pedibusque atris ; sat nitidus ; capite fere æqualiter punctulato, oculis modice approximatis, intus sulco sat angusto marginatis ; prothorace modice convexo, quam longiori (et postice quam antice) duabus partibus latiori, leviter inæqualiter punctulato, lateribus a basi antrorsum arcuatim convergentibus, margine antico leviter concavo, angulis anticis haud productis sat obtusis posticis (superne visis) obtusis ; elytris modice convexis, seriatim punctulatis, puncturis in seriebus

sat crebris sat subtilibus, interstitiis distincte sat crebre punctulatis ; prosterno inter coxas sulcato ; metasterno in medio sparsim subtiliter, ad latera et in episternis sat obsolete, punctulato ; abdomine subtilius minus crebre punctulato, sat fortiter (præsertim latera versus) longitudinaliter strigato ; antennis elongatis, articulis ultimis leviter incrassatis ; femoribus anticis antice sparsim subtiliter punctulatis ; tarsorum posticorum anticulo basali quam ceteri conjuncti vix breviori. Long., 5 l.; lat., $2\frac{3}{5}$ l.

The colour of the upper surface is somewhat uniform, but differs from different points of view, in some lights appearing a rich green, in others coppery, in others a mixture of the two, the suture in most examples being more or less golden. Viewed from the side, the upper outline appears evenly and only slightly arched (somewhat as in *C. ferrens*, Germ., not strongly convex with the arch at its greatest height near the front of the elytra, as it is in *C. cupripennis*, Hope). The puncturation of the upper surface is much like that of *C. ferrens* ; it differs from that of *C. cupripennis* by the stronger and less close seriate punctures of the elytra. The eyes are much more approximate than in either of the above-named species, and are margined within by a well-defined but narrow sulcus.

This species appears widely distributed in W. Australia, and the examples I have seen vary little except in size, and in some being a little more elongate than others. The largest example I have seen is $6\frac{1}{4}$ l. long.

W. Australia.

C. Meyricki, sp. nov. Elongato-ovalis ; modice nitidus ; capite prothoraceque cyaneo-viridibus, elytris obscure violaceis, corpore subtus cyaneo, antennis palpis pedibusque nigris ; capite sparsim subtiliter punctulato, oculis modice approximatis, intus sulco sat angusto marginatis ; prothorace sat convexo, quam longiori duabus partibus (postice quam antice etiam magis) latiori, vix manifeste punctulato, lateribus a basi antrorsum (superne visis) sat fortiter minus arcuatim convergentibus, margine antico vix concavo, angulis anticis obtusis nullo modo productis posticis (superne visis) obtusis ; elytris modice convexis, seriatim punctulatis, puncturis in seriebus sat remotis sat fortibus, interstitiis vix manifeste punctulatis ; prosterno medio inter coxas et antrorsum ad marginem anticum sulcato ; corpore subtus fere lævi ; antennis elongatis, articulis ultimis vix incrassatis ; femoribus anticis vix manifeste punctulatis ; tarsorum posticorum articulo basali quam ceteri conjuncti sat breviori. Long., 6 l.; lat., 3 l.

Resembles *C. eremita* in shape and in the structure of the eyes, but differs widely from it in other respects. The true margin of the prothorax is exceptionally strongly rounded, but although the true margin is not quite so bent down (it is more so than in *C. eremita)* as to be quite invisible from above, its strong curve is not apparent when the segment is viewed from above.

W. Australia; taken by E. Meyrick, Esq.

N.B.—A somewhat larger example (long., $6\frac{3}{4}$ l.), more attenuated behind, and having the puncturation of the underside a little less obsolete, and the colour a little more obscure, is probably the other sex of this species. It was taken on the Elder Expedition by Mr. Helms, in the Victoria Desert. I have founded this description on the example taken by Mr. Meyrick because I had already applied to it and used the name *C. Meyricki*, although no description has yet been published.

MORDELLIDÆ.

MORDELLA.

M. exilis, Germ.? Several specimens of the insect which I take to be this species were captured by Mr. Helms at the Fraser Range. I believe *M. exilis* to be very variable and widely distributed, but it is possible that some of the forms which I refer to it may prove to be good species. The examples from the Fraser Range are identical *inter se*, and are larger and differently coloured from the type. It will perhaps be advisable to give them a name even as a variety of *exilis*. This form might be characterised as follows:—

Var.? *obscurior*. Quam exemplum typicum major (long., 2—$2\frac{1}{3}$ l.), supra tota nigro-brunneo-pubescens.

I take this opportunity of characterising another insect which I hesitate to separate from *M. exilis* specifically, although to a casual glance it looks very distinct; but I have seen specimens that seem more or less intermediate.

Var.? *rufimanus*. Quam exemplum typicum major (long., $1\frac{1}{2}$—2 l.); supra læte pallide brunneo-pubescens, certo adspectu aurantiaco-micans; subtus argentea, certo adspectu aurantiaco-micans; capite antice femoribus anterioribus 4 et tibiis anticis rufis. Hab., S. Australia (Port Lincoln).

MELOIDÆ.

ZONITIS.

Z. Helmsi, sp. nov. Fusca, antennis tibiisque obscurioribus; capite elongato, crebre rugulose sat crasse punctulato, antennarum articulo 3° quam 2us triplo longiori; prothorace sparsim minus fortiter punctulato; elytris pubescentibus, crebre minus fortiter sat crasse punctulatis. Long, $3\frac{4}{5}$ l.; lat., 1 l.

The antennæ are slightly more than half the length of the whole body (joint 1 about half as long as the space between the eyes is wide, 2 very short, the rest not differing much *inter se* in length). The head is a little longer than it is wide across the eyes, and about as long as the basal four joints of the antennæ together; the labrum a trifle longer than the clypeus, sulcate down the middle, its front part clothed with short hairs. The prothorax is slightly shorter than the head, about as long as wide (to a casual glance, longer), about as wide as the head, its sides parallel in their hind (and converging forward in their front) half, obscurely impressed on the disc, and deeply transversely near the front. In a certain light a faint luteous vitta seems to run down each elytron. The tibiæ are straight. The hind body is too much distorted for accurate description, but seems to be that of a male.

Not much like any previously-described species; perhaps nearest structurally to *Z. bipartita*, Fairm.

Murchison district.

CURCULIONIDÆ.

Brachyderini.

EVAS.

E. Everardensis, sp. nov. Nigra; squamis albis crassis sat dense vestita; rostro sat crasso, basi capite haud angustiori, antrorsum angustato, supra carinis flexuosis circiter 6 munito; antennis squamosis; prothorace sat cylindrico, quam latiori vix longiori, crebre tuberculato-ruguloso; elytris postice divaricatis acuminatis, leviter striatis, striis sat crasse punctulatis, interstitiis vix convexis confertim granulatis (exemplorum haud abrasorum sub squamas abditis), humeris breviter acutis, lateribus arcuatis. Long., $4\frac{1}{2}$—5 l.; lat., $1\frac{1}{5}$—$1\frac{3}{5}$ l.

Very distinct from the previously described species of the genus by its black colour and close vestiture (apparently very easily rubbed-off) of coarse white scales; also by the peculiar sculpture of its rostrum.

Everard Range.

E. crassirostris, Pasc.? The example to which I apply this name comes too near Mr. Pascoe's description to be justifiably treated as a new species Mr. Pascoe, however, says that the prothorax in *crassirostris* is longer than wide. In the insect before me the prothorax appears so to a casual glance, but by careful measurement it is found to be, if anything, wider than long. The elytra are rather thickly clothed with very short inconspicuous curved setæ, which Mr. Pascoe does not mention in describing his insect, although in the description of

another *Evas (acuminata)* published at the same time he mentions the presence of three rows of such setæ on the elytra.
West of Fraser Range.

OTIORHYNCHINI.

PROXYRODES, gen. nov.

Rostrum crassum quam caput haud longius; scrobes apicales abbreviatæ, supra sat approximatæ; oculi subrotundati; antennæ longæ graciles, scapo arcuato prothoracem vix attingentis, funiculo 7-articulato; prothorax transversus, basi apiceque subtruncatus, lateribus arcuatis; scutellum modicum; elytra quam prothorax multo latiora; pedes modici; femora abrupte clavata et subtus dente acuto armata; corbuli postici aperti; tarsorum articulus secundus minus brevis; unguiculi liberi; metasternum minus breve; abdominis segmenta basalia 2 æqualia, 3° 4° que conjunctis quam 2us vix longioribus, sutura prima fere recta; processus intercoxalis sat latus.

The dentate femora of this genus distinguishes it from all its Australian allies except *Proxyrus*, from which its slender antennæ, longer metasternum, &c., render it very distinct.

P. maculatus, sp. nov. Niger; squamis nigricantibus et nonnullis griseis intermixtis vestitus (his griseis caput pedes et corpus subtus tota tegentibus, in prothorace bivittatim positis, et in elytris limbum basin lateraque fimbriantem et maculas parvas numerosas quadratas in disco positas formantibus); rostro supra subtiliter 3-carinato, carinis externis antice divergentibus scrobes intus definientibus; antennarum funiculi articulis basalibus 2 elongatis, 1° quam 2us vix longiori, ceteris inter se subæqualibus sat elongatis, 3° 4° que conjunctis quam 2us fere brevioribus, clava quam articuli præcedentes 3 conjuncti vix breviori; prothorace transverso, antice truncato parum angustato, basi vix leviter bisinuata, lateribus modice arcuatis, angulis posticis (superne visis) acutis extrorsum directis; elytris pilis suberectis pallidis minus brevibus minus sparsim vestitis, punctulato-striatis, interstitiis sat planis, basi leviter bisinuata, humeris leviter extrorsum rotundato-prominulis. Long., 2—2$\frac{2}{5}$ l.; lat., $\frac{7}{10}$—$\frac{4}{5}$ l.
Everard Range.

IDASPORA.

I. terrea, Pasc.? An insect taken on the Fraser Range is certainly, I think, conspecific with the South Australian species to which I have doubtfully attributed this name, and concerning which a note of mine was published in Proc. Linn. Soc. N.S.W., 1892, p. 118.

Leptopsini.

So small a proportion of the Australian *Curculionidæ* have been described, that it is a very difficult, and perhaps not altogether a very desirable, thing to deal with small collections, such as that of the Elder Expedition, of isolated new species of that family. The difficulty is increased by the considerable amount of unsatisfactory work that has been already done by Mr. Pascoe, whose genera are most perplexing, being generally characterised either in a few words, mentioning a distinction from some other genus, or with an amount of detail that runs to the opposite extreme. Thus in the case of most of Mr. Pascoe's *Leptopsid* genera the comparative length and width of every joint in the antennæ is made a generic character, with the result that it is very seldom one can say of any species (unless it be the typical one of the genus) that it thoroughly agrees with the characters of any genus named by Mr. Pascoe. Until a great deal more work has been done with species, it appears to me that minute detail in generic characters is rather to be avoided, and that so long as their structural characters are sufficiently detailed in the specific descriptions, species are for the present best dealt with by being grouped in genera whose assigned characters are few, and unmistakeably salient.

Among the characters that have been most relied on as generic in the Australian *Leptopsini* are those founded upon the structure of the claws, which assume four different forms in the named genera –*(a)* two equal free claws to each tarsus, *(b)* two equal soldered claws, *(c)* two unequal claws, *(d)* a single claw to each tarsus. I may remark that my collection contains species having claws of still another type, viz., two claws on the front tarsi, and only one on each of the hinder four, and further that these different structures seem to pass so insensibly from one to the other in some intermediate species, that I cannot resist some doubt as to their value, or at any rate as to whether they will be very easily made use of when a large number of species have been described. All the four claw-structures enumerated above are represented in the *Leptopsini* of the Elder Expedition.

Other characters that have been relied upon as generic in the *Leptopsini* of Australia are found in the corbels of the hind tibiæ, the length of the antennal scape, the form of the eye, and the presence or absence of a scutellum, and apart from these characters one or two genera have been formed on exceptional peculiarities in other parts of the body.

All these latter characters seem to be of real value, and to deserve to be regarded as truly generic, and I am of opinion that for the present it is better to rely upon them chiefly for the

generic distribution of species. To add such trivial characters as Mr. Pascoe has done surely confuses instead of assisting, and would involve the creation of new and unstable genera in bewildering multitude.

With these preliminary remarks I proceed to enumerate the *Leptopsini* of the Elder Expedition.

ESSOLITHINA.

The essential characters of this genus, which are sufficient to distinguish it from all other described genera of Australian *Leptopsini*, are as follows: anterior coxæ contiguous, hind corbels open, eyes more or less rounded, a single claw on each tarsus. The following species presents all these characters, but does not agree with Mr. Pascoe's diagnosis of *Essolithna* in respect of some of the many minor characters attributed to the genus. Probably Mr. Pascoe would make it the type of a new genus allied to *Essolithna*. I, however, prefer to call it *Essolithna*.

E. seriata, sp. nov. Ovalis sat convexa; nigra antennis subferrugineis; squamis nigris et nonnullis aureis dense vestita, his in prothorace vittas 4 irregulares formantibus et in elytris in striis seriatim maculatim dispositis; setis brevissimis curvatis instructa; rostro brevi, antrorsum subdilatato, a capite sulco minus perspicuo diviso, postice longitudinaliter sat subtiliter canaliculato, parte antica dimidia lamellam atram glabram retrorsum angulatam (ut in gen. *Polyphradis* exemplis) formanti; antennis elytra vix attingentibus, sat robustis, pilosis, scapo oculum vix superanti, funiculi articulis inter se haud multo inæqualibus nullis transversis, 2° 6° 7° que quam ceteri paullo longioribus, clava quam articuli præcedentes 2 sublongiori; scrobibus profundis postice latis, margine inferiori deflexo; oculis late ovalibus infra paullo angustatis minus subtiliter granulatis; prothorace transverso, antice paullo angustato, tuberculis parvis umbilicatis crebre obsito, subtiliter canaliculato, lateribus fortiter rotundatis, lobis ocularibus angulatis ciliatis; scutello nullo; elytris prothorace fere dimidio latioribus plus quam duplo longioribus, punctulato-striatis, interstitiis sat planis, basi emarginatis, humeris rotundatis; femoribus prope apicem squamis pallidis annulatis; tibiis anticis intus minus perspicue denticulatis; segmentis ventralibus basalibus 2 elongatis (basali quam 2us manifeste longiori, illo antice lato fere truncato), segmentis 3° 4° que conjunctis quam 2us fere brevioribus, sutura prima leviter arcuata. Long., $2\frac{2}{3}$ -$3\frac{1}{2}$ l.; lat., 1 -$1\frac{1}{2}$ l.

The arrangement of bright golden scales among the general black vestiture at once separates this species from all allied forms known to me. In a well-marked example the golden scales are

as follows: on the head three vittæ and a sprinkling over the whole surface, on the prothorax four wide irregular and interrupted vittæ, on the elytra small patches in the striæ (here and there dilating on to the interstices) which give the appearance of numerous conspicuous golden yellow spots. The ring of pallid (scarcely golden) scales round the femora near their apex—it is interrupted on the inner face of the femora -is also a conspicuous character. I have, however, seen a single example in which the golden scales are nearly wanting (probably through abrasion), and this one is of an almost uniform deep opaque black colour. This species differs from the two previously described of the genus *inter alia* by the second joint of the funiculus slightly longer than the first joint,

West of Fraser Range; also in my collection from W.A. (exact locality unspecified).

POLYPHRADES.

P. tumidulus, sp. nov. Piceo-niger, pube ochraceo-grisea vestitus; rostro supra planato, utrinque ante oculum et supra scrobis partem posticam sulcato, antice lamella atra glabra parva munito, hac retrorsum ut carina abbreviata continua; antennis prothoracis basin vix attingentibus, funiculi articulo 1° quam 2us fere duplo longiori, ceteris quam hic sat brevioribus inter se sat æqualibus, 3° fere (7° plane) transversis; scrobibus retrorsum dilatatis, margine superiori oculum medium versus directo, margine inferiori valde deflexo; oculis ovalibus infra sat angustatis, subtiliter granulatis; prothorace quam longiori duabus partibus (postice quam antice vix perspicue) latiori, sat crebre minus crasse ruguloso, nullo modo canaliculato, lateribus modice rotundatis, lobis ocularibus sat prominentibus sat latis; scutello haud perspicuo; elytris ad basin quam prothoracis basin vix latioribus, mox pone basin valde rotundato-ampliatis (hic quam ad basin dimidio, quam prothorax fere tertia parte, latioribus), hinc ad apicem æqualiter arcuato-angustatis, punctulato-striatis, interstitiis sat planis, angulis humeralibus dentiformibus; tibiis anticis intus denticulatis; unguiculis valde inæqualibus, denticulo interno vix perspicuo; segmentis ventralibus ut *Essolithnæ seriatæ*. Long., 3—4 l.; lat., $1\frac{2}{5}$—$1\frac{4}{5}$ l.

This species differs from all the *Polyphrades* known to me by the structure of its claws, which, to a casual glance, appear to be limited to a single claw on each tarsus, and this appears to be dentate near its base; but on careful examination this dentate appearance is seen to be caused by the presence of a very short second claw closely soldered to its fellow, except at its extreme apex, which projects as a minute tooth-like point. A further very

salient character consists in the remarkable rounded dilatation of the elytra immediately behind the base, causing the elytra to be suddenly swollen out (at a distance from the base equal to about a quarter of their whole length) to a very much greater width than their width at any other part. This elytral structure is less exaggerated in the small examples, which I take to be males, than in the larger ones.

Everard Range.

P. satelles, Blackb.? Among the *Curculionidæ* of the Elder Expedition are a number of large examples (from the Fraser Range, and places east of it) of *Polyphrades*, all of them so much abraded as to be unsuitable for description even if representatives of an undescribed species. I believe them, however, to be *P. satelles*, Blackb., which I characterised from examples taken in S.W. Australia. Mr. Pascoe has long ago (Tr. Ent. Soc., 1872) stated that the sexes of *Polyphrades* differ considerably in form, and in the relative proportions of the prothorax and elytra; and also that the males are subject to considerable *variation* in these respects. I believe this to be the case, and that in recognition of its being so, the examples I am discussing (although there is certainly no little variation of form among them) should probably all be regarded as conspecific; admitting, nevertheless, that the examination of specimens from which the pubescence had not been removed might possibly lead to a different opinion. The species bears no little resemblance to the common South Australian *P. longipennis*, Pasc., but is at once distinguished from it by the very evidently coarser sculpture of the prothorax, and by the different proportions of the joints in the funiculus of the antennæ. In *P. longipennis* the basal two joints are elongate, the second not much shorter than the first; while joints 3-7 are much shorter and subequal *inter se*: in *P. satelles* the second joint is not very much more than half as long as the first, and not much longer than the third. I may take this opportunity to remark that when I described *P. satelles* I called the second joint of the funiculus, as compared with the third, "vix longior," and that this phrase is scarcely correct, and represents the disparity between the joints as less than it really is, as the second joint is *distinctly* (though not much) longer than the third.

P. rugulosus, sp. nov. Piceus, squamis brunneo-fuscis confertim vestitus; rostro 5-carinato, antice lamella atra glabra munito; antennis prothoracis basin vix attingentibus, funiculo ut *P. tumiduli*; scrobibus oculisque ut *P. tumiduli* sed oculis vix tam subtiliter granulatis; prothorace quam longiori quarta parte (postice quam antice parum perspicue)

latiori, crasse vix profunde vermiculato-ruguloso, nullo modo canaliculato, lateribus leviter arcuatis, lobis ocularibus latissimis sat prominulis; scutello minuto; elytris sat elongatis, basi subtruncatis, punctulato-striatis, interstitiis convexis, humeris obtusis, sutura postice sat fortiter elevata; tibiis anticis intus denticulatis; unguiculis et segmentis ventralibus ut *Polyphradis* typici. Long., 7 l.; lat., $2\frac{1}{5}$ l.

A large and elongate but typical *Polyphrades;* distinguished by its uniform fuscous-brown vestiture, its elytral suture strongly elevated behind, and the very coarse vermiculate sculpture of its prothorax, which closely resembles the prothoracic sculpture of *Leptops tribulus*, Fab. The posterior declivity of the elytra is nearly perpendicular, and the outline of the elytra, viewed from the side, is gently sinuate in its declivous part.

W. of Fraser Range.

CHERRUS.

C. inconspicuus, sp. nov. Piceo-niger, squamis piceis dense vestitus, his nonnullis, albidis nonnullis cupreis variegatis; rostro cum capite fortiter sparsim punctulato; illo supra longitudinaliter leviter impresso vix perspicue carinato, antice lamella atra glabra triangulari munito; antennis sat elongatis, scapo oculos longe superantibus, funiculi articulis basalibus 2 elongatis inter se fere æqualibus, 3° multo brevioribus, ceteris quam 3us paullo brevioribus nullo modo transversis; scrobibus ut *Polyphradis tumiduli*; oculis late ovalibus infra angustatis; prothorace (maris) quam longiori tertia parte (postice quam antice dimidio) latiori, crasse profunde (ut *Leptopis tribuli* subsimiliter sed magis crebre magis profunde) vermiculato-ruguloso, postice linea longitudinali minus perspicue impresso, lateribus sat arcuatis, lobis ocularibus minus validis; scutello punctiformi; elytris (maris) quam prothorax haud latioribus, basi conjunctim late leviter emarginatis (basi prothoracis basi subæquali), elongato-ovalibus, punctulato-striatis, striis 4^a^ 5^a^ que ante medium sat fortiter contortis, puncturis in striis sat magnis, interstitiis convexis, sutura postice haud carinata, angulis humeralibus acute dentiformibus extrorsum directis; tibiis anticis intus valde denticulatis; unguiculis ut *Cherri* typici. Long., 4 l.; lat., $1\frac{3}{5}$ l.

The coppery scales form some interrupted irregular vittæ on the head and rostrum, and some small ill-defined spots on the prothorax and elytra; the whitish scales are chiefly on the sides of the rostrum, head, prothorax, and metasternum, and along the top of the lateral declivous part of the elytra, form a ring round each of the femora, and are somewhat condensed about the apex

of the tibiæ; the apical part of the elytra is moderately strongly declivous (not very nearly perpendicular), and the upper outline of the elytra (viewed from the side) is an even curve (*i.e.*, from the scutellum to the apex there is no *sinuation* in the outline). No doubt near *C. aureolus*, Pasc., but *inter alia* with the joints of the antennal funiculus very differently proportioned.

W. of Fraser Range.

C. longulus, sp. nov. Elongatus; elytris opacis; piceo-niger, squamis nigris (dense) et setis pallidis (sparsim) vestibus; rostro cum capite crebre subtiliter nec profunde ruguloso; illo 5-carinato, antice lamella triangulari fere ut rostrum punctulata munito; antennis sat elongatis, scapo oculos sat longe superantibus, funiculi articulo basali quam 2us fere duplo (hoc quam 3us haud multo) longiori, articulis 3- -7 sat elongatis inter se subæqualibus, clava elongata quam funiculo haud multo validiori; scrobibus ut *Polyphradis tumiduli*; prothorace quam longiori quarta parte (postice quam antice vix quinta parte) latiori haud canaliculato, leviter vermiculato-ruguloso (fere ut *Leptopis tribuli*, Fab., sed sculptura minus fortiter impressa), rugulositate pone marginem anticum obsoleta, lateribus sat rotundatis, lobis ocularibus minus validis; scutello punctiformi; elytris (maris?) quam prothorax vix latioribus, basi conjunctim vix emarginatis, elongato-ovalibus, punctulato-striatis, striis sat æqualibus, puncturis in striis modicis, interstitiis convexis, sutura postice haud carinata, angulis humeralibus distinctis vix acutis; tibiis anticis intus sat fortiter denticulatis; unguiculis ut *Cherri* typici. Long., 5 l.; lat., 2 l.

This species has much of the facies of a *Polyphrades*, but its antennæ are those of a *Cherrus*, the scape being long enough to impinge upon the prothorax when set back. It is a narrow elongate insect with a prothorax of somewhat globular appearance, and much more nitid than the elytra. The sculpture of the prothorax is very much like that of *Leptops tribulus*, but it becomes quite obsolete close to the front margin. The elytra are moderately strongly declivous behind, and the elytral outline viewed from the side is a nearly even curve, but is slightly sinuous close to the apex, owing to the apex itself being a little prominent hindward.

Murchison District.

C. nanulus, sp. nov. Præcedenti affinis sed minus elongatus, elytrorum lateribus multo magis rotundatis; supra sat depressus; colore et vestitu ut *C. longuli*: capite rostroque fere ut *C. longuli* sed rostro minus distincte 5-carinato, lamella antica magis nitida minus fortiter punctulata;

antennis paullo minus elongatis magis robustis, funiculi articulis 3-7 minus elongatis nec plane transversis; prothorace paullo magis transverso, crebre leviter (fere obsolete) granulato; elytris quam prothorax quarta parte latiori. Long., 5 l.; lat., $2\frac{1}{3}$ l. (vix).

In colour and vestiture very like the preceding but *inter alia* with the prothorax considerably narrower than the elytra and entirely differently sculptured, its sculpture resembling that of *Polyphrades longipennis*, Pasc. Like the preceding, this species has all the general appearance of a *Polyphrades*, but the scape of its antennæ reaching back considerably beyond the eyes places it in *Cherrus*. It is of the same sex (male) as the type of *C. longulus*. The outline of its elytra viewed from the side is an even curve.

Murchison District.

LEPTOPS.

L. biordinatus, sp. nov. Mas. Elongatus; sat angustus; niger, indumento sordide brunneo (præsertim in capite et in partibus excavatis) vestitus; rostro supra longitudinaliter concavo, 5-carinato, carinis 2° et 4° inter oculos retrorsum productis et hic abrupte desinentibus nec gradatim in capitis superficiem confusis, scrobibus postice latis male determinatis; prothorace quam longiori quinta parte (postice quam antice plus quam dimidio) latiori, crasse vermiculato-ruguloso, late leviter canaliculato (canalis fundo longitudinaliter carinato), antice profunde sinuato-emarginato, postice truncato, lateribus a basi ultra medium æqualiter leviter vix arcuatim divergentibus, angulis posticis fere rectis; elytris sat æqaliter cancellato-punctulatis, interstitiis 3° 7° que tuberculis conicis validis armatis (illo prope basin vix in tuberculis fracto), interstitio 5° plus minusve distincte costiformi, parte declivi summa tuberculo magno ad suturam instructo, humeris acutis antrorsum directis; prosterno antice tuberculo magno antrorsum directo utrinque armato et pone coxas tuberculo mediano bifido instructo; metasterni angulis posticis externis prominentibus; segmento ventrali apicali ad latera sulcato, parte mediana æqualiter convexa sparsissime punctulata; elytrorum interstitiis tuberculatis intermediis retrorsum leviter convergentibus. Long., 10—12 l.; lat., $3\frac{1}{3}$ -4 l.

Femina. Multo latior, elytrorum tuberculis multo minus validis, interstitio 5° in medio obsolete tuberculato. Long., 15 l.; lat., 6 l.

This species may be roughly described as resembling *L. tribulus*, Fab., but with the intermediate carinæ of the rostrum (*i.e.*, those

between the middle one and the lateral ones) continued back on the head nearly to the level of the hind margin of the eyes and there ending abruptly—as in *L. colossus*, Pasc.—(instead of gradually merging into the general surface of the head about at the level of the front of the eyes), the rostral scrobes wide behind and not clearly defined, and the fifth interstice of each elytron in the male not at all tuberculate, and at most only very feebly carinate, and in the female appearing as a feeble or moderate carina tuberculiform only to the extent of being more or less broken about the middle of its length into detached pieces, which appear somewhat like very obtuse feebly raised tubercles; in many examples of the male the fifth interstice does not differ from the fourth and sixth. Closely compared with *L. tribulus* the rostrum is seen to be much stouter, the prothorax to be much more widely and less definedly canaliculate with the channel traversed longitudinally by a carina (which is wanting in *tribulus*), the two rows of tubercles next the suture (*i.e.*, one on either side of it) gently approximating hindward, the two tubercles adjoining (on either side) the suture a little in front of the apex less close to each other (although much nearer to each other than they would be if they were in the line of the tubercles on the third interstice), and the sterna very differently sculptured. The humeral angles of the elytra are acute and directed forward, while in *tribulus* they are rounded off.

The only other previously described species that this one seems to resemble at all closely is *L. Duboulayi*, Pasc. (from Champion Bay). I have not to my knowledge seen that insect, and the description of it is almost useless. With unaccountable oddity, Mr. Pascoe founded the species on the female, although he mentions having the male before him. He says that *Duboulayi* resembles *tribulus*, but differs by its prothoracic channel being of other form (deep in front and wide behind), and the third and fifth interstices of the elytra being tuberculate only in the hinder part, neither of which characters fits the present insect satisfactorily (especially if, as Mr. Pascoe implies, they distinguish both sexes). If this insect, moreover, were *Duboulayi* it seems impossible that Mr. Pascoe could have compared it with *tribulus*, and not have noticed the difference in the rostral carinæ, the stoutness of the rostrum, &c.

The tubercles on the elytra are of much the same size and shape as the corresponding tubercles in the same sex of *tribulus*.

Fraser Range; appears to be common.

L. raucus, sp. nov. Præcedenti *(L. biordinato)* affinis; differt elytris multo magis crasse sculpturatis (interstitio 5° etiam maris tuberculis distinctis nonnullis armatis, interstitiis 2° 4° 6° que vix continuis), forma magis convexa ad latera

magis arcuata, latitudine majori ad (vel fere pone) medium posita. Long. (maris), 13 l., (feminæ) 15 l.

This species resembles the preceding in the sculpture of its rostrum; the prothorax is almost similar, but is a little more dilated and rounded near the front, so that the sides appear slightly sinuate; the sterna and ventral segments are similar; but the general form and the elytral sculpture are so different that I feel compelled to treat it as more than a variety. In *biordinatus* the elytra are very parallel, and are at their widest distinctly in front of the middle; while in *raucus* they are decidedly more oval, and are at their widest *at* the middle in the male, and slightly *behind* the middle in the female. As regards the sculpture of the elytra, in *biordinatus* the non-tuberculate interstices are distinctly traceable as fine longitudinal lines, the spaces between them being somewhat feebly cancellate-punctulate, owing to the presence of series of transverse lines similar to those which form the interstices; all this sculpture, however, having a feeble and blurred appearance. In *raucus* no longitudinal interstices are distinctly marked, except the three tuberculate ones; the spaces between those three (and between the suture and the inner one) being occupied by strong irregular transverse lines, which in places run right across from the suture to the middle tuberculate carina, passing in a zigzag fashion between the tubercles of the first row; here and there two of these transverse lines are connected by a short oblique or longitudinal line, but not by anything like a *continuous* longitudinal line. The humeral angles are even sharper than in *biordinatus*, and in none of the examples of either sex before me of *raucus* do the tubercles of the first row coalesce in front into anything like a continuous carina

Barrow Range; also in my own collection from the neighbourhood of Eucla.

L. gravis, sp. nov. Elongato-ovalis; robustus; niger indumento griseo-brunneo vestitus; rostro supra longitudinaliter concavo, 5-carinato, carinis 2° et 4° gradatim in capitis superficiem confusis, scrobibus (fere ut *L. tribuli*, Fab.) sinuatis bene determinatis; prothorace quam longiori quinta parte (postice quam antice circiter dimidio) latiori, crassissime vermiculato-ruguloso, late canaliculato (canali antice in fovea magna paulo pone marginem anticum desinente), antice profunde sinuato-emarginato, lateribus superne visis sat rotundatis sed mox ante basin fere parallelis, angulis posticis rectis; elytris striis punctulatis 6 impressis puncturis fere foveiformibus sat crebre nec æqualiter in striis positis, interstitiis omnibus tuberculis crebris obtusis formatis, tuberculis in interstitiis 3° 5° 7° que quam in ceteris magis elevatis

(tuberculis in interstitio 3° antice plus minusve costam formantibus, in 3° 5° que postice et in 7° toto sat magnis sed parum acutis—fere ut *L. tribuli*, sed minus acutis—interstitio 1° paullo ante apicem fere ut *L. tribuli* tuberculo sat magno instructo), humeris breviter acutis antrorsum directis; sternis ut *L. biordinati;* segmento ventrali apicali ad latera sulcato, parte mediana sparsissime fortiter punctulato et longitudinaliter sat late sulcato; elytrorum interstitiis tertiis inter se parallelis.

Feminæ in elytris tuberculis minoribus magis obtusis. Long., 12—16 l.; lat., $4\frac{4}{5}$—6 l.

Nilpena; also in my collection from Lake Eyre basin and the McDonnell Ranges.

L. areolatus, sp. nov. Elongato-ovalis; robustus; ater, indumento pallide-brunneo vestitus (? in partibus concavis solis); capite fere ut *L. gravis* sed rostro supra haud concavo; prothorace fere ut *L. biordinati* sed paullo magis crebre minus crasse vermiculato-ruguloso, elytris in areolas irregulariter quadratas divisis, his 6-seriatim longitudinaliter dispositis, interstitio 3° postice tuberculis magnis circiter 4 instructo 5° in medio obtuse obsolete tuberculato, 7° toto tuberculis inæqualibus conicis instructo, tuberculis subsuturalibus nullis, humeris sat acutis vix antrorsum directis; sternis ut *L. biordinati;* segmento ventrali apicali fere ut *L. gravis* sed sulco mediano angusto; elytrorum interstitiis tertiis retrorsum leviter convergentibus. Long., 15 l.; lat., 6 l.

At once distinguishable from most of its allies by the total absence of the two approximate tubercles that are found in so many species near the summit of the posterior declivity of the elytra, one on either side of the suture. The tubercles on the elytra are all somewhat blunt and not very strongly raised, except the apical two or three of the third interstice, the apical one of the seventh interstice, and one at the junction of the third and seventh interstices, which are proportionally about as large as the corresponding tubercles in *L. tribulus* (male). The areolæ into which the elytra are divided are sharply cut and foveiform; they are many times wider and longer than the interstices that limit them; there are about twelve areolæ in the length of the front half of the elytra.

Barrow Range; unique.

L. planicollis, sp. nov. Elongato-ovalis; robustus; ater, indumento (exempli typici) fere nullo; capite ut *L. biordinati;* prothorace quam longiori fere tertia parte (postice quam antice fere duplo) latiori, sat crasse vermiculato-ruguloso, parte mediana tertia abrupte subcirculariter planato vel

leviter concavo, antice profunde emarginato, lateribus sat fortiter rotundatis mox ante basin fere parallelis, angulis posticis rectis; elytris obscure 6-seriatim cancellato-punctulatis, interstitio 3° longe ultra medium carinato pone medium tuberculis 2 vel 3 permagnis armato, interstitio 7° toto tuberculato (tuberculis apicem versus permagnis), interstitiis ceteris vix distinctis, parte inter carinas abrupte planata, humeris sat acutis antrorsum directis; sternis abdomineque ut *L. biordinati*; elytrorum interstitiis tertiis retrorsum leviter convergentibus. Long., 12 l.; lat., $4\frac{1}{2}$ l.

I am not sure of the sex of the type of this remarkable species, but believe it to be a male. The species may be at once distinguished from all its allies by the perfectly flat median space of the prothorax and elytra (viewed from the side the upper outline appears as a perfectly continuous straight line from the front of the prothorax to the posterior declivity of the elytra), together with the fifth interstice being quite devoid of tubercles, and scarcely distinguished from the fourth and sixth interstices. Although not taken by the Elder Expedition, this species is sufficiently allied in its characters and habitat to the above to be suitably described here.

W. Australia; Eyre Sand-patch.

L. Interioris, sp. nov. Valde elongatus; minus convexus; dense murino-squamosus; rostro fere ut *L. graris*, sed haud concavo; prothorace quam longiori (et postice quam antice) quarta parte latiori, vermiculato-ruguloso, anguste sat profunde canaliculato, paullo pone apicem transversim sulcato, antice profunde emarginato, postice vix bisinuato, lateribus leviter arcuatis, angulis posticis subrectis; elytris punctulato-striatis, puncturis in striis minus crebris, interstitiis sat latis, 3° 5° que leviter convexis postice in tuberculis minus elevatis fractis, interstitio 7° toto tuberculis parvis instructis, interstitio 1° (subsuturali) postice tuberculo modico instructo, humeris rotundatis; prosterno antice vix tuberculato pone coxas tuberculo bifido instructo; metasterno simplici; segmento ventrali apicali æqualiter convexo; elytrorum interstitiis tertiis retrorsum fortiter divergentibus. Long. 10—13 l.; lat., $3\frac{1}{2}$—5 l.

Not much like any species of *Leptops* previously described, but resembling *Hopei*, Schönh., in its vestiture, though of a darker colour. The comparatively slender antennæ (with the scape exceptionally long) and legs, together with the elongate form, give it an aspect less robust than that of most of its congeners. The sculpture of the elytra is much like that of a female *L. tribulus*, and does not differ much sexually. From *L. tribulus* this species

differs by its much less robust and less convex form, the long slender antennæ, the smallness of the tubercles in the seventh elytral interstice, the almost complete disappearance of the tubercles on the front of the prosternum (which are not at all pointed forward), its rostrum not at all concave, even at the apex, &c. Very fresh examples of this insect have the elytra thinly clothed with short thick setæ of a bright golden colour, especially near the apex.

Nilpena ; also in my collection from the McDonnell Ranges.

L. contrarius, sp. nov. Ovalis; minus elongatus; niger, indumento (exempli typici) vix manifesto ; capite prothoraceque fere ut *L. biordinati*, sed scrobibus minus dilatatis; elytris æqualiter nec profunde cancellato-punctulatis, interstitiis 3° 5° que ad (vel fere ultra) medium anguste costatis (his postice et interstitio 7° toto tuberculis sat parvis instructis), interstitio 2° paullo ante apicem tuberculum modicum ferenti, humeris vix acutis haud antrorsum directis ; prosterno antice utrinque tuberculo acuto haud antrorsum directo et pone coxas tuberculo mediano bifido armato ; metasterni angulis posticis externis vix tumidulis ; segmento ventrali apicali sat crebre punctulato, utrinque impresso. Long., 11 l.; lat., $4\frac{1}{2}$ l.

[am not sure of the sex of the specimen on which this description is founded, but believe it to be female. The structure of the head and rostrum (the second and fourth carinæ of the rostrum ending abruptly between the eyes, the scrobes not expanded as in *L. biordinatus*, &c.) in itself distinguishes the insect from all the preceding species.

Barrier Range.

L. sulcicollis, sp. nov. Ovalis ; piceus, indumento sordide brunneo obscure vestitus ; rostro supra planato, 5-carinato, carinis 2° et 4° inter oculos retrorsum productis et hic abrupte desinentibus, carina mediana retrorsum vix minus quam 2us 4us que producta, scrobibus postice latis male determinatis ; prothorace quam longiori tertia parte (postice quam antice paullo magis) latiori, fortiter vermiculato-ruguloso, late profunde longitudinaliter sulcato (sulci fundo longitudinaliter carinato), antice profunde emarginato, postice truncato, lateribus a basi ultra medium sat recte divergentibus, angulis posticis rectis; elytris inæqualiter punctulato-striatis (puncturarum interstitiis rugulosis vix continuis), triseriatim tuberculatis, tuberculis conicis acutis, tuberculo parum elevato postice utrinque juxta suturam posito, seriei internæ tuberculis a basi retrorsum gradatim majoribus, serierum intermediæ et externæ tuberculis sat regularibus, hac longe

ultra elytrorum medium continua, illa medium vix superanti, humeris sat acutis haud antrorsum productis; prosterno antice utrinque tuberculo vix antrorsum directo et pone coxas tuberculo mediano bifido minus conspicuo, armato; metasterno utrinque postice subtuberculato; segmento ventrali apicali sat æqualiter convexo, subcrebre punctulato; elytrorum seriebus tuberculorum retrorsum leviter convergentibus. Long., 6 l.; lat., $2\frac{2}{3}$ l.

This species is at once distinguishable from all the preceding species of *Leptops* (apart from its diminutive size) by its having, like *L. tribulus*, three series of tubercles on each elytron, none of which become simple carinæ near the base. It resembles several of Schönherr's species of *Leptops*, from which it differs *inter alia* as follows:—From *dumosus* by the unusually elongate median carina of the rostrum, and by there not being on each elytron three exceptionally large tubercles placed triangularly; from *hystricosus* and *spinosus* by its wide, deep, and entire prothoracic channel; from *spiniger* by the absence of an isolated strong spine near the shoulders.

Interior of South Australia.

LAND AND FRESH-WATER MOLLUSCA.

By W T. BEDNALL,

Hon. Curator for Conchology, Public Museum, Adelaide.

[Plate I.]

The number of species collected is seven —one fresh-water and six land-shells—namely, *Bulinus* (one), *Helix* (four), *Bulimus* (two). The number of living specimens obtained was fairly large, when the excessive drought which prevailed throughout the journey of the party is taken into consideration. The species of *Bulinus*, the only fresh-water-shell taken, occurred in a waterhole at a locality at which the party camped at the very commencement of the Expedition, is one that is widely distributed throughout the province of South Australia. Of the four *Helices* procured one proved to be identical with a species discovered by Professor Tate at Waukaringa some years ago, whose description of it is included in this paper. Another is *Helix perinflata*, described many years ago, but still a scarce shell in collections; while the remaining two are new species. The two species of *Bulimi* are both well-known West Australian forms.

Helix (Galaxias) perinflata, *Pfr.*

Pro. Zool. Soc., 1863; *Cox*, Monograph Australian Land Shells.

(Pl. I, fig. 6.)

This shell was first obtained by Mr. F. G. Waterhouse in the MacDonnell Ranges, Central Australia, when accompanying John Macdougall Stuart in his exploration across the continent, and was described by Pfeiffer in 1863 from the specimens there procured. It was the prevailing species collected by Mr. Helms, and specimens were taken from Mount Illbillee on the Everard Range, westward to the Victoria Desert. Those taken at the commencement of the journey answer most closely to the description transferred by Dr. Cox to his Monograph of the Land Shells of Australia. A feature of these particular specimens is that some of them are encircled with a somewhat broad rufous band just above the periphery, which in very many of the examples has a tendency to spread towards the suture. In others again there is not the slightest semblance of the band of colour, and it is evidently specimens of this type that were submitted to Dr. Pfeiffer, as he makes no mention of this character.

Of a number of living and mature shells received by me some two years since some do and some do not exhibit the band.

This species varies a great deal, not so much in shape as in thickness, and again in coloration. The typical form is solid, but by far the greater number of the shells obtained during the expedition are comparatively thin, and appear to be identical with a race of this species which has extended southwards from the MacDonnell Ranges, and of which we have examples collected at Wilson and Carrieton. At one locality a dwarf form was taken very much in size and shape like *Helix Flindersi*, Adams and Angas, but without the colour-bands of that species. In coloration the shell varies considerably; some are a creamy-white, others have a faint interrupted cloudy-reddish band just above the periphery; in others this band becomes a most distinctive marking, while in very many the band extends from the periphery to the suture, being darkest in the centre. In the dwarf examples the shell is of a uniform greenish hue, with a shining vitreous appearance.

A description of the animal of *H. perinflata* from MacDonnell Range specimens supplied by me, is given by Mr. Hedley in Proc. Roy. Soc., Queensland, vol. 6, p. 250, 1889.

The species was taken at the following localities :—

At the Everard Range on gneissic rock, at an elevation of 1,800 feet.

Mount Illbillee Soakage, Everard Range, under fig-trees, at an elevation of 2,000 feet. It was here that the dwarf specimens with the vitreous appearance were taken in company with one of the normal form.

Near Camp 4. Amongst spinifex, on sandy soil with lime outcrop.

Twenty miles south-east of Camp 4. Under spinifex.

Between Everard and Birksgate Ranges.

Near Camp 8. Under fig-trees, on granite rock.

Near Camp 10. In debris, under fig-trees, on granite rock.

Camp 14. Under granite rocks.

Birksgate Range. Amongst granite boulders under fig-trees.

Skirmish Hill. One dead specimen. On porphyrytic rock.

Cavenagh Range.

Near large clay-pan. About three miles south of Camp 58, Victoria Desert.

Between Fraser Range and Yilgarn Goldfield.

Helix (Hadra) fodinalis, *Tate*.

(Pl. I, figs. 1*a*—1*c*.)

Shell moderately umbilicated, globosely conic, rather thin and somewhat glossy; surface coarsely- and closely-wrinkled trans-

versely, somewhat closely and finely incised-striate in a spiral direction.

Whorls four and a half, regularly convex, separated by a linear suture ; first two and a half whorls almost smooth, but minutely granulated and obsoletely wrinkled ; the granulations disappear, and the wrinkles increase in strength and closeness with the revolution of the spire.

Last whorl somewhat inflated, slightly descending in front, base convex to the umbilical margin. Umbilicus moderately wide with precipitous sides, and towards the inner lip subangulated.

Aperture oblique, subcircular ; peristome subacute, slightly reflected, margins not joined by a callus. Columella-margin dilated above and slightly extending over the umbilicus.

Colour, a pale-brown above, paler beneath, sometimes with a narrow reddish-brown infuscation in front of the suture.

Animal :—Foot of a chestnut colour with grey rugosities, broad and short behind ; eye-pedicels of a blackish and tentacles of a chesnut colour ; collar milk-white.

Dimensions :—Major and minor diameters, 18 mm. and 15 mm.; altitude, 14·25 mm ; height of aperture, 10 mm.; length of aperture, 9 mm.; diameters of umbilicus, 3 and 3·5 (vix.) mm.

Affinities and Differences :—The nearest ally of this species is *H. Nullarborica*, mihi, from which it differs in the absence of an impressed suture , finer and closer spiral striæ, larger umbilicus, as well as by coloration and thinness of test ; it is related to *H. Angasiana*, Pfeiffer, but has more regularly convex whorls, coarser growth-lines, less-rotund and not so descending aperture, less thickened and reflected peristome. *H. bitaeniata*, Cox, is a more distant alliance, from which it differs mainly by its less-elevated spire and large umbilicus.

Habitat.—Taken alive in considerable numbers in March, 1876, beneath blocks of stones on the outcrop of the auriferous reef at Waukaringa, S. Australia.—*R. Tate.*

Between Victoria Spring and Fraser Range. One dead specimen.

Helix (Hadra) Everardensis, *spec. nov.*

(Pl. I., figs. 3*a*—3*c*.)

Shell umbilicated, globosely conical, somewhat thin, translucent ; lower whorls closely ribbed by stout irregular and oblique flat-topped costæ, which are coarsest behind the aperture, and gradually fade away on the upper whorls into fine striæ ; under the lens irregularly pitted throughout ; epidermis, pale yellow, much abraded, exposing in places the chalky-white of the shell substance ; encircled immediately above the periphery by a

chocolate zone about a millimetre broad, and beneath the suture, which is impressed, a slightly narrower band of the same hue, the intervening space being wider than either band, the spire is so coiled that the suture throughout its extent divides the lower band of the upper whorl from the upper band of the succeeding one, lip of aperture white; whorls four and a half, gradually increasing, evenly rounded from the suture to the base, last descending in an alignment with the peripheral band; aperture very oblique, oval-lunate, slightly expanded and reflected above, and much so beneath; columella remarkable for its wide and straight expansion, callus thin, transparent; umbilicus narrow, deep, and spiral, abrupt at the margin and steep within, partially overhung by the dilated columella, and slightly choked by an internal swelling of the termination of the last whorl.

Dimensions.—Major diameter, 13 mm.; minor, 11·5 mm.; alt., 9·25 mm.; height and length of aperture, 6·75 mm.; diam. of umbilicus, 2·5 mm.

This species, of which only a single specimen was obtained, is the smallest member of the subgenus *Hadra* yet known, and comes very close to one taken during the expedition to Lake Eyre in the years 1874-5, of which there are two examples in the South Australian Museum collection.

Mr. Brazier on seeing the shell noted its very close resemblance to *H. australis*, Menke, but the figure of that species as reproduced in Dr. Cox's monograph could not be taken as a guide to its identification.

Near Illbillee Soakage, Everard Range, at an elevation of 2,000 feet.

Helix (Hadra) Elderi, *spec. nov.*

(Pl. I., figs. 2*a*—2*c*, 4, 5.)

Shell umbilicated, depressedly globose, thin, translucent, coarsely obliquely striated, more so at the suture; yellowish-white, and having two rufous bands, one, the broader, just above the periphery, and the other at the suture, the suture being wound round the centre of the lower band of the preceding whorl, and the right margin of the peristome inserted at the lower edge of this band; spire elevated, obtuse at the apex. Whorls five, convex, regularly increasing, the last rounded and inflated at the base in the region of the lip, descending slightly in front; aperture oblique, roundly lunate, margins approximating, peristome thin, broadly reflected, and very effusely dilated; columellar margin narrowly expanded above, and reflected over and partially concealing the umbilicus.

Measurements.—Major diam., 17 mm.; minor diam., 14 mm.;

alt., 12 mm.; height and length of aperture, 10 mm.; diameter of umbilicus, 2 mm.

This species is allied in its general characters to many South Australian congeners, and is also ornamented with the rufous bands so peculiar to the most of them, but is specially remarkable for the very effuse dilatation of the outer lip, more particularly so where it reaches the base of the shell.

Birksgate Range; under fig-trees amongst granite boulders.

The following anatomical notes are furnished by Mr. C. Hedley, F.L.S., of the Australian Museum:—

Two shells, containing the snails of *Hadra Elderi*, Bednall, were examined. The animals were much attenuated, and had evidently been captured during the course of a long fast. The aperture was sealed by a tough leathery epiphragm, behind which was packed a mass of congealed mucus, the snails having retired more than half-a-whorl within the shell. Though the shells indicated mature individuals, the genital system was shrunk into the condition of a half-grown animal, the consequence probably of starvation. I was therefore unable to make any observations upon this portion of their anatomy.

The jaw (pl.. I, fig. 4) is rather wide, boomerang-shaped, crossed by seven stout ribs which denticulate the concave but not the convex margin, ends rounded.

Radula (pl. I., fig. 5) strap-shaped, measuring 6 x 2 mm; formula 28 : 12 : 1 : 12 : 28. Rachidian cusp single, ovate-lanceolate, apex projecting beyond the basal margin; base broadly expanded anteriorly. Immediate laterals larger than the rachidian, cusps stout ovate, the tips overlapping the base; alate angle of the base expanded. In the remoter laterals the cusps grow more slender, and the bases diminish. Transition teeth show a distal accessory cusp budding from the base of the main cusp; then a proximal cusp appears near the summit of the main cusp. In the marginals these accessory cusps increase relatively while the teeth diminish in size till the extreme marginals offer trifid blades.

Bulimus dux, *Pfr.*

(Proc. Zool. Soc., p. 24, 1861; *Cox*, Monograph Australian Land-shells, p. 74, pl. xiii., fig. 4.)

A dull whitish shell, nearly two inches in length, with the interior tinged with pale pink. No specimens taken alive.

Fraser Range *(Elder Expedition)*; also King George's Sound *(Masters)*.

Bulimus melo, *Quoy et Gaimard*

(Voy. d'Astrolabe, Zool., vol. II., p. 110, pl. ix., fig. 6-7; *Cox*, Monograph Australian Land-shells, p. 74, pl. xiii., fig. 6.)

A somewhat solid inflated shining shell, of which there are several varieties showing special markings. Specimens taken by the Expedition were dead, but their form is sufficient for purposes of identification.

Between Victoria Spring and Fraser Range; and Fraser Range (*Elder Expedition*). Also King George's Sound (*Quoy et Gaimard* and *Masters*), Fremantle (*Bacon*).

BULINUS NEWCOMBI, *Adams and Angas.*

(P. Z. S. p., 416, 1863; *Reeve*, Con. Icon., pl. 3, f. 21.)

This species has a much inflated and somewhat produced aperture. It is widely distributed throughout the colony of South Australia; the type specimens are recorded from Mt. Margaret, Central Australia. It occurs in many of the streams flowing from the Flinders Range –in Mannanarie Creek at Wirrabara; in the Rocky River at Laura; in the Nelshaby Reservoir; also on Eyre Peninsula *(Tate);* and in more southern localities it has been taken in the River Para *(Tate)*, the River Angas at Strathalbyn, and in the South-East at Penola, Binnum, and other adjacent localities by the late Mr. Tomsett.

Upper Arkaringa Creek *(Elder Expedition)*.

EXPLANATION TO PLATE I.

Fig.

1*a*-1*c*. Helix fodinalis, *Tate*. Three views slightly enlarged.

2*a*-2*c*. Helix Elderi, *Bednall*. Three views slightly enlarged.

3*a*-3*c*. Helix Everardensis, *Bednall*. Three views slightly enlarged.

4. Jaw of Helix Elderi, magnified.

5. Six teeth from different regions of the radula of Helix Elderi; their relative positions are indicated by numerals annexed. Highly magnified.

6. Helix perinflata, *Pfeiffer*. Nat. size.

HYMENOPTERA.

By WALTER W. FROGGATT,

Technological Museum, Sydney.

The Hymenoptera collected by Mr. R. Helms, of the Elder Exploring Expedition, having been handed to me to classify, I submit the following account of them. In several instances I have to pass over several interesting insects that are very likely new species, as I do not feel justified in describing them without a better knowledge of the literature of this much neglected group in Australia, than is accessible to me in Sydney; while as regards the ants I abstain from dealing with them, as my knowledge of the family is very superficial.

Considering that the collection is the result of nearly nine months gathering in the sandy ridges and ranges of Central Australia, I think it very meagre, and remarkable for containing none of the typical fossorial wasps of this part of the continent, while the Pompilidæ, Sphegidæ, Vespidæ, and larger Eumenidæ are very poorly represented, and the Formicidæ comprises only eight species from a country which simply swarms with ants in ordinary seasons.

However, in all expeditions, even under the best management, collectors have many difficulties to contend with, that often prevent them from making such extensive collections as they might wish.

This collection contains 57 specimens (including a number of small ants on a card as one). The following is a list of specimens in their natural order, with the locality as given on the collector's label :—

ICHNEUMONIDÆ.

Cryptus, *sp.*

This is one of our commonest species, and has a very wide range over the whole of Australia, about Sydney it is parasitic on the larvæ of several common moths that crawl upon the grass.

Mount Squires ; one example.

Ophion (three species).

Only one species of this genus has been described from Australia, and most likely these, apparently three distinct species are

new, but it is a very difficult group to work at without plenty of material, and one of the specimens has lost its abdomen.

Cootanoorina Creek ; one specimen of each species.

EVANIIDÆ.

Gasteruption, *sp.*

This appears to be the same species that we find in the vicinity of Sydney.

Mount Squires ; two specimens.

FORMICIDÆ.

The ants consist of eight different species, none of which are very remarkable ; chief among them is a metallic-green ant, of which there are thirteen specimens from Victoria Desert ; a large hairy ground-ant, a small *Myrmica*, a *Formica*, a number of small ants gummed on a card, and several others.

MUTILLIDÆ.

Mutilla formicaria, *Fabr.*

This is one of our largest *Mutilla*, and has a very wide range over Australia. It was one of the many insects obtained by Banks, and described in Fabricius' "Systematica Entomologica." This specimen looks as though it had been in spirits, as the white pubescence and hairs are apparently discoloured ; it is somewhat larger than those obtained in the vicinity of Sydney.

Victoria Desert, W.A.; one female.

Mutilla Elderi, *sp. nov.*

Female. Length, .2 lines.

Black, legs ferruginous, ornamented with a patch of yellow hairs upon the abdomen.

Head very round, finely punctured, and covered with scattered black hairs ; thorax square in front, swelling outwards from the prothorax, narrow at metathorax, covered with large confluent punctures, and clothed with scattered white hairs at base; legs ferruginous, and very hairy.

Abdomen, first segment narrow, finely punctured, clothed with scattered white hairs at base ; second segment large, oval, finely but deeply punctured, clothed on sides with scattered black hairs, the centre covered with a dense patch of golden hairs, which occupy the whole length of segment ; third, fourth, and fifth segments fringed with yellow hairs ; sixth segment shiny ferruginous, smooth, and shining.

Fraser Range, West Australia.

THYNNIDÆ.

THYNNUS TAENIOLATUS, *sp. nov.*

Male. Length, 6 lines.

Head black, round, covered with white hairs on face, finely rugose on forehead; thorax and legs black, a pale white band along the outer margin of mesothorax, which is finely punctured, with an impressed line on either side, a white mark on either side of the mesothorax from the base of hindwing to the bottom of scutellum; scutellum broad at base, twice the width of apex, which is margined with a white mark. Wings slightly fuscous. Abdomen black, first segment marked with pale yellow fascia almost divided in two by small black line; second, third, fourth, and fifth segments marked with broad yellow fasciæ, which are roundish, and interrupted in centre with small black line, the outer edge of these segments margined with whitish yellow. Underside of first segment with small wedge-shaped spot, of third, fourth, and fifth marked with club-shaped patch, the apex of each margined the lower edges of the segment with dull white.

One specimen in damaged condition, having lost its antennae.

RHAGIGASTER INTEGER, *Fabr.*

This is a common species, having a very wide distribution over the greater part of Southern Australia.

Victoria Desert.

LARRIDÆ.

PISON, *sp.*

Mount Squires.

POMPILIDÆ.

FERREOLA, *sp.*

Fraser Range.

EUMENIDÆ.

ODYNERUS, *spp.*

Three species of this genus are represented, though it is quite possible that one is only a variety. Many of our Australian *Odynerus* are described in Saussure's "Supplement to his Monograph of the Vespidæ," a work that is not obtainable in any of our Australian libraries.

Mount Squires.

ANDRENIDÆ

HALTICUS, *sp.*

Mount Squires; one specimen, a small burrowing bee, probably a new species.

GENUS AND SP. UNCERT.

Victoria Desert; one specimen, a very curious little banded bee with a broad abdomen.

GENUS AND SP. UNCERT.

Mount Squires; seven specimens of burrowing bee.

APIDÆ.

ANTHOPORA CINGULATA, *Fab.*

Described under the name *Andrena cingulata* in his Systematica Entomologica, vol. II., p. 314.

This pretty little banded bee has a very wide range over the southern parts of Australia, and is not uncommon about Sydney.

Three specimens; Nilpena, Central Australia.

SARAPODA BOMBILIFORMIS, *Smith.*

This fine bee is common about Sydney in the summer, often flying into the house.

One specimen; Mount Squires.

CROCISA ALBO-MACULATA, *Smith.*

Also recorded from the northern parts of New South Wales and Queensland.

Mount Squires; two specimens.

MEGACHILE BLACKBURNII, *sp. nov.*

Female. Length 8 lines, black, clothed with white hairs.

Tongue and mouth parts ferruginous; head very closely and finely punctured; face densely clothed with silvery white hairs, which form a thick brush, drooping down over the mandibles; cheeks behind the eyes and underside of head closely covered with silvery white hairs; thorax very finely but closely punctured covered with a close pile of white hairs on the underside and at apex above.

Fore legs ferruginous on the upper side of tibiæ, under portion dark-brown, tarsi produced into bright yellow pollen brush, claw ferruginous, covered with white hairs; middle legs ferruginous on upper side of tibiæ and tarsi, dark-brown on underside, clothed with white hairs; tarsi ferruginous, and fringed with white hairs much longer at base of tarsi.

Abdomen constricted at base of each segment with narrow smooth impressed band, which is more finely punctured than upper portion of segment; first segment densely clothed in long white hairs; second segment with scattered white hairs and a bright white patch of close short silvery hairs on either side;

third segment similarly ornamented with smaller white patches, the following segments shining, lightly fringed on lower margins with white hairs ; underside of abdomen clothed with long white hairs forming a tuft standing out on either side of the last segment.

Wings hyaline, upper portion of marginal cell and outer edges of forewings faintly fuscous, nervures black.

Three specimens.

Male ; 5 lines. Black, finely punctured and covered with white hairs, differing from female in having all the legs black and closely covered with white hairs, the upper sides of first and second segments of abdomen clothed with long white hairs, and the remaining segments with scattered white hairs.

Mount Squires ; one specimen.

GEOLOGY.

By VICTOR STREICH.

Graduate of the Mining Academy, Freiberg; Geologist to the Expedition.

Geological Map and Plates II.—V.

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CHAPTER I.

The COUNTRY *between* WARRINA on the Great Northern Railway *and the* EVERARD RANGE having already been explored and geologically made known, I do not consider it necessary to give a detailed report upon it, though a brief summary of my interpretation of the geological phenomena may be expected from me.

From WARRINA to COOTANOORINA, about twenty miles distant, the surface-features are sandy ridges, trending north and south, alternating with clay and loam-flats of considerable area. The sands and loams overlie gypsum-bands and indurated gypsiferous clays, which, when rising above the level of the plain, appear as low flat-topped ridges. The wide flats bordering Arkaringa and Laura Creeks are copiously covered with efflorescent salts. All these deposits are of Newer Tertiary and Recent date.

Between Nilpena and Cootanoorina, where the formation changes from Tertiary to Cretaceous, mound-springs occur, which yield an unlimited supply of good stock-water.

Alongside ARKARINGA CREEK, near Cootanoorina, extensive gravel-beds exist, and the banks of the creek are composed of calcareous sandstone. These stony downs and gravelly plains continue as far as a line of elevated table-topped hills, which rise about 1,000 or 1,200 feet above sea-level, and on an average 500 feet above the plain; they are distant about 60 miles from Warrina. The rocks of these table-topped hills comprise jasper-rock, flinty quartzites, sandstone and conglomerate in horizontal or slightly undulating beds; the whole formation is of Cretaceous age. About 110 miles west from Warrina the Cretaceous formation is covered by red sands and loams of late Tertiary age, which continue as superficial deposits to near ARCOELLINA WELL, 157 miles from Warrina. Here Palæozoic rocks make their appearance, consisting of quartzites, argillaceous slates and sandstones; they rise in Mount Chandler and Chambers Bluff to a considerable altitude, extend for a long distance in a S.W. direction, and are highly promising for mineral prospecting. Ten miles west from Arcoellina, these rocks are concealed beneath wide loamy plains, but re-appear to the south-east bordering the main mass of the Everard Range, as gneiss and other schists.

The EVERARD RANGE, which rises in Mount Illbillie to an elevation of 3,010 feet above sea-level, consists entirely of coarse granites apparently intruded among the fore-mentioned Palæozoics; the depressed areas, which interrupt the continuity of the range, are covered with loam and sand. The granitic rocks are intersected occasionally, but more so in the southern portion of the range, by dykes of diorite. Generally the granite contains little or no mica, and a little only of hornblende.

CHAPTER II.

From the Everard Range, S. Aust., to the Barrow Range, W. Aust.

I. PHYSIOGRAPHY.

The Everard Range extends westward as far as Ferdinand River, a distance of 50 miles reckoned from Mount Illbillie. Several strong creeks discharge themselves along the southern base of the range; and between its main mass and the outlying parts there are fine alluvial flats covered with a good soil consisting of a clayey mixture of the decomposed felspathic rocks which surround them. The creeks, winding through tectonic valleys of the granite-masses, have considerably enlarged some of them by their erosive action; especially is this the case in the lower parts of the valleys. No sooner do these creeks leave the granitic surfaces than they disappear suddenly in the sand, such places being rendered conspicuous by the abundance of grass and herbage arising from the underground storage of water.

The granite-rocks have, hereabouts, a tendency to weather into cavernous recesses, in one of which pictorial designs done by the aborigines were discovered.

As Ferdinand River is approached, the outcropping rocks become fewer and less prominent, and when of granite they tend more and more to the form of low turtle-back-shaped rises.

On both sides of Ferdinand Creek low ridges or banks of limestone are noticeable, which define the ancient bed or the limit of its former area of inundation (see fig. 1, pl. ii.). The width of the creek is about 20 yards, but was perfectly dry at the time we crossed it. Judging from the fine-grained sand and the absence of large gravel and debris, the descent of the river is not very steep, and the power of the periodical floods is limited as far as erosion or ablation is concerned. The river-banks are therefore low, not exceeding six feet, and are composed of fine sand, without gravel, throughout that depth.

After crossing the Ferdinand, sand-dunes of moderate elevation make their appearance; they exhibit no regularity as regards direction, probably because of the irregularity in the direction of the wind, which is here influenced and broken by the surrounding hills.

The general surface-feature between Everard Range and Camp 4 is that of large alluvial sandy plains, the sand resulting from the weathering of the granitic rocks which rise abruptly from the plain in bold masses and peaks. At their base and in their vicinity travertine is of constant occurrence.

The elevation of the plain above sea-level is at the Ferdinand about 1,800 feet, as determined by barometric observation; and

at Camp 4 1,575 feet, as determined by hypsometric observation.

From Camp 4 Messrs. Lindsay and Helms made a flying-trip towards the south for about 50 miles. From the nature of the specimens collected by Mr. Helms from actual outcrops, and from the ascertained topographical configuration, the country in this direction seems to change very suddenly in proportionately short distances. Starting from Camp 4, the same class of country extended to ten miles; next, low sandstone-ridges were traversed for 15 miles, after which claypans, with abundance of crystallised gypsum, were conspicuous features, and here traces of an extinct mound-spring were observed.

Leaving Camp 4 in a chiefly south-west direction, the country travelled over was of the same character until Camp 12 was reached, namely, granite intersected by greenstone-dykes, which appear as boulders and bosses rising out of sandy plains now and then, but especially in the vicinity of the granitic rocks low banks of travertine occur. In this part of the country the sand-dunes are more numerous, and the intervening depressions are covered with gravel or coarse sand; their general trend is north and south, and their height from 20 to 25 feet.

Towards the north the Musgrave Range is visible as a long line of bold peaks shadowed in a dim, blue light; to the south low, indistinct ranges are noticeable.

The mean height of the plains is here 1,560 feet, by barometric reading, and the granite hills do not exceed 250 feet.

Travelling from Camp 6 in a southerly direction we passed long, low hills having the shape of a marquee (see fig. 3, pl. 2, fig. 7, pl. 4), and trending east and west. They seemed to be the continuation of the ridges of which Chambers Bluff is the most prominent elevation. They consist of quartzites and sandstones, and have a steep escarpment on the north side of about 50 or 70 feet, whilst the southerly slope is less abrupt. From one of the most elevated of these hills, 210 feet above the northern plain, several parallel lines of similar hills were noticeable to the south and west, some of them presenting steep, scarped fronts, also on the north; others were seen afterwards, from the tops of Mounts Watson and Sir Thomas, extending to the westward, which connect them with the Townsend Ridge, which was reached later.

Leaving this range on a north-westerly course, we travelled over sandy plains with wind-drifted, sand-dunes, the intervals between them being thickly wooded with "mulga," and eventually reached the outlying portions of the Birksgate Range. Mount Watson (see fig. 5, pl. 3), the Birksgate Range (see fig. 6, pl. 3), and some smaller contiguous elevations consist of granite

in bold fantastic outlines; they rise very abruptly out of the sandy plain, and are very little, or not at all, covered with vegetation. At the south-western base of the range, and in the wide plain-like valleys which are protected from drifting sand, there are winding creeks and flood-channels; here herbage and timber is abundant, and a fair supply of surface-water is obtainable. The water-supply could, however, be considerably increased by damming the narrow gullies, and by sinking to the subterranean basins which intervene between the hills. The continuously-elevated ground occupies a large area, and outlying portions of the range occur at considerable distances away from it.

The western, more than the eastern section of the range, is penetrated by hornblendic rocks; this feature is well-displayed in Mount Agnes and Blyth Hill (see fig. 2, pl. 2), the latter of which has a back-bone of diorite running right through it. The Blyth Range of Gosse, ill-defined by him, is now proved to be an outlying part of the Birksgate Range, and is degraded by Mr. D. Lindsay to the rank of Blyth Hill.

Mount Watson is a dome-like mass of imposing aspect (see fig. 5, pl. 3), 2,200 feet high, and 726 feet above the surrounding plain; Mount Sir Thomas, the highest elevation of the Birksgate Range, is 2,535 feet above sea-level, and 680 feet above the plain; Blyth Hill is 2,300 feet above sea-level, and 550 feet above the level of the plain, as determined by Mr. Lindsay. The mean elevation of the plain, deducible from the above figures, is 1,700 feet above the level of the sea.

The soil in the wide valleys of the Birksgate Range is of a rich loamy nature, and principally overlies travertine; beyond them drift sand, clothed with a luxuriant growth of porcupine-grass, is prevalent.

Geologically and physiographically the stretch of country which ends in Mount Agnes is a moderately elevated granitic upheaval, roughly parallel with the Musgrave and Macdonnell Ranges. It is largely covered with alluvial deposits, which allow only the summits of the axis of elevation to be visible. Two of these masses are especially prominent; the western one is composed of the Birksgate Range and its spurs, the eastern one of the Everard Range and its numerous outliers; the latter is probably connected with the Musgrave Range to the north.

From Camp 24 the elevation of the spinifex-plain declines westward to the base of Skirmish Hill, where on Moses Creek the depression reaches its minimum of 1,335 feet above sea-level, as determined by the hypsometer, representing a fall of about 400 feet in from 40 to 50 miles.

Skirmish Hill is a somewhat isolated eminence, 580 feet above the plain at its eastern base. Though it is apparently connected

with the adjacent Tomkinson Range to the north, it consists of a porphyritic rock. Moses Creek, which debouches on the eastern plain, has a very short course. It is here we found a tree which had successively been blazed by the explorers Gosse, J. Forrest, and Mills.

At about 50 miles from Skirmish Hill the Cavenagh Range was reached. The intervening country was of the most desolate appearance. Travertine and sand-dunes abound, interrupted only by one low granitic ridge, much intersected by quartz-dykes. In this granitic ridge occurs a rock-hole of most peculiar shape, which yielded us several hundred gallons of water. It is in the form of a narrow channel about two feet wide and about seven or eight feet long, sloping to the west, then extending easterly into a horizontal chamber some six feet wide. Close to this rock-hole I found under some sheltering rocks an abundance of flint- and chalcedony-chips, apparently the refuse from the manufacture of stone-implements. Intermingling with these were marsupial-bones, so that the whole constitutes a veritable "kitchen-midden." Similar accumulations I had noticed at Camp 20, which was also near a big waterhole, and at Camp 23, in the Barrow Range.

The Cavenagh Range, which rises in Mount Cooper to 2,175 feet above sea-level, is composed of plutonic and trappean rocks; the interspersed wide valleys are well-grassed, and each is generally traversed by a creek. E. Giles records,* during his four or five days' halt in this neighbourhood in the month of December, the daily passage of an earthquake-wave at about 3 p.m., accompanied by "the sounds of smashing and falling of rocks hurled from their native eminences, rumbling and crushing into the glen below," coincident with which on one occasion was a temporary interruption to the flow of water from a spring.

The very compact diorites of the higher part of the range are weathered into immense boulder-like masses and bosses, the former of which are sometimes poised on top of one another in a very extraordinary manner. It is therefore highly probable that some of these poised-blocks, expanding under the influence of the fierce sun of a Central Australian summer, do lose their equilibrium, and, tumbling down, cause a regular mountain-slip, which may for some time block the flow of a weak-running rivulet. The coincidence in time of the daily occurrence of the so-called earthquake shock with that of the most intense heat lends support to my explanation of the cause of the phenomenon and its periodic recurrence. Moreover, with the view to the fullest investigation possible to me, I erected a kind of seismograph, after the plan of

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* Geographic Travels in Central Australia, p. 132.

Mallet, but not the least indication of a terrestrial wave was experienced.

Between the Cavenagh and Barrow Ranges, a distance of 25 miles, the surface features are low sand-ridges, alternating with travertine deposits. The Barrow Range is constituted of a parallel series of granite hills, having a north and south trend, at least in its southern section, which alone was visited by us. At its southern end the range attains its highest elevation in Mount Squires, of 2,270 feet above sea-level. It consists chiefly of semiporhyritic rocks, and the much-broken country gives rise to several creeks, which water alluvial flats carrying a rich growth of herbage and other vegetation. South from Mount Squires are low ridges of sandstone, which are connected towards the west with Townsend Ridge.

The principal axes of elevation in Central Australia are the Macdonnell, Musgrave, and Everard Ranges, which represent a series of almost parallel waves or undulations of contemporaneous origin. The most southerly is the Everard Range, which continued through Mount Agnes and Blyth Hill, is obliquely connected with the Tomkinson Range; the westerly extension of the Musgrave Range. This gigantic upheaval, viewed as one, is bounded on the south by a belt of sedimentary rocks, probably of Devonian age, which commences with the ranges about Mount Chandler and Chambers Bluff on the east, and ends in Townsend Ridge on the west. The country examined by me, which lies between these two boundaries, viz., to the north the Archæans of the Central Australian elevation, and to the south the less prominent upheavals of a more recent date, is occupied by the debris of the formerly overlying sedimentary formations. Thus the general geology of this section of the journey is of a simple kind; but the stratigraphical phemonena in detail are not without interest, as may be gathered from the following description.

II.—DESCRIPTIVE GEOLOGY.

A. Sedimentary Rocks.

1. Recent Surface Deposits and Tertiary Rocks.

From the Everard Range the country slopes gradually to the west as far as Ferdinand River, on either side of which, but at some distance off, outcrops of *travertine*, with alternating ridges of *chalcedony* appear (see fig. 4, pl. 3). These strata as superficial deposits are next in importance to the loams and sands, which occupy a very large area of country between Everard and Barrow Ranges. In some localities the limestone is interstratified with layers of chalcedony and lenticular masses of a travertine blackened by carbonaceous matter; both I regard as a secondary

product resulting from the decomposition of the neighbouring granitic and hornblendic rocks.

The *travertine* has frequently a concretionary structure, and includes sand and fragments of the adjacent rocks; sometimes it cements the gravel of the plains to a form of conglomerate. The thickness of the travertine crust varies considerably up to twelve feet.

The lenticular masses of *black travertine* attain to three or four feet in the longer diameter; if broken, or the pieces be rubbed together, an empyreumatic odour is given off. An analysis of a sample from Ferdinand River gave the following percentage values:—Carbon, 8; calcic carbonate, 38; magnesic carbonate, 11; silica and oxide of iron, &c., 43. (Similar blackened concretionary travertine is described by Professor Tate from the country around the Great Bight in Trans. Roy. Soc. S. Aust., vol. 3, p. 115).

Chalcedony as a stratified deposit was found *in situ* at several places, especially along the western bank of Ferdinand River, where it forms a stratum of three feet thick beneath travertine. As debris, chalcedony is found in great abundance all over the area under consideration; not only profusely scattered over the plains, and forming an integral part of the sands, but abundantly diffused over the granitic rocks of this region. It was found as high as 2,700 feet on Mount Sir Thomas, and also on the top of Mount Illbillie, 3,100 feet.

These siliceous accumulations, as well as the above-mentioned calcareous ones, must be regarded as aggregations of siliceous or calcareous material, as the case may be, derived from the Tertiary or the fundamental Azoic rocks. Their formation may still be going on, especially in and near creek-beds; and no doubt whether it be continuous or not, it is contemporaneous with the latest and most abundant superficial deposit—that of the sand.

The *sand ridges* reach a height of, not exceeding, 60 feet. They have a general trend of north and south, though their course is occasionally interrupted by granitic outcrops. The material is a fine drift-sand, chiefly composed of quartz, either white or ferruginous; particles of felspar are seldom discernible. The thickness of the sand-cover is very variable; anything like a *subsoil* could not be seen, unless the wide loamy flats which occur between, and particularly on the south-east side of the ranges, are to be regarded as representing it.

The *loamy flats* are generally watered by creeks, and where this is the case *fluviatile gravels* are of frequent occurrence. No gravel-plains, as the term is understood in the northern part of South Australia, exist in this region; but its gravel-beds are of true fluviatile origin—the outcome of the erosive force of the

flooded creeks, and they seldom extend beyond a few hundred yards from the mountain-slope from which they have been derived. River-formed gravels of some extent occur in Moses Creek at Skirmish Hill, and near Fort Mueller in the Cavenagh Range.

Clay-pans are very scarce in this country. A few of very limited area were observed inside Cavenagh Range, and near Barrow Range.

2. Palæozoic and Metamorphic Rocks.

This formation constitutes the marquee shaped hills*; already described as running almost parallel with the granitic ranges. At Camp 11, where these rocks were first encountered, they are about 10 miles distant from the nearest granitic upheaval, a distance which was also approximately ascertained by Messrs. Lindsay and Helms and by Mr. Wells on their respective flying-trips towards the south. There can be no doubt that these hills are geologically identical with those to south and south-east of the Everard Range, and with the Townsend Ridges further westward; and it may be safely inferred that the same formation composes the Warburton and Sutherland Ranges, although the rock-specimens from the former, collected by Mr. Lindsay, are not exactly the same as, whilst those from the latter, collected by Mr. Leech during a flying-trip to Gibson Desert, are similar to those from the Townsend Ridges.

The hills to the east and south east of the Everard Range consist chiefly of quartzites and sandstones, with which are associated slate, limestone and gneiss. Specimens of all these were brought back by Mr. Helms from his flying-trip to the south. The marquee-hills consist chiefly of apparently unfossiliferous quartzites, but in a creek-bed, which occupies one of the valleys among them, there occurs a gravel consisting of mica-schist and gneiss, and though I did not succeed in finding these schistose rocks *in situ*, yet there can be no doubt that they are component parts of the Palæozoic formations in this region. Moreover in Turban Hill the relation of the quartzite to the metamorphic rocks is well-defined. The basal part of the section consists of a metamorphic granite, and the upper part of a quartzite, whilst the intermediate beds show a passage from one to the other; the succession from below upwards is as follows:—Granite containing quartz-pebbles, a silico-feldspathic magma, changing into quartzite, ferruginous quartzite, whitish coloured quartzite.

Two small outcrops of primary rocks occur, at ten miles east

* Probably identical with the Tent-Hill formation of Mr. H. Y. L. Brown, Government Geologist of S. Aust. See Report on the Geology between Port Augusta and Eucla, 1885, p. 2.

of Barrow Range, as isolated hills of granulite, which is distinctly stratified with a low angle of dip towards south. I consider this granulite as a part of the formation of the Townsend Ridges, of which it may represent a lower stratum. Pieces of a scaly quartzite, containing small laminæ of white mica were picked up at old "wurleys" and camping places of the blacks, who have apparently used them as grinding-stones for seeds, and, although not seen *in situ*, yet there is presumptive evidence that this very distinctive rock occurs within the geographic limits of the tribe. A specimen of a similar quartzite was collected by Mr. Leech at the Sutherland Range, where it, as he informed me, occurs in low ridges, with a southerly escarpment.

The width of this Palæozoic belt, of which quartzite seems to be the main component, varies probably very much, but from the evidence already adduced, it extends between latitudes 27° 35′ and 28° 30′, at least 100 miles towards south, whilst at the Townsend Ridges it does not exceed 30 miles, though it is here abundantly covered with Tertiary deposits.

B. Eruptive Rocks.

1. Plutonic Rocks.—*Granite* of a truly eruptive character is the most prevalent member of this class. At all places of its occurrence it presents on the surface a spheroid or ellipsoid outline, and exhibits internally a concentric structure. Large cuboidal masses of it are abundantly scattered over the granite hills, their shape being the result of cleavage in three directions almost perpendicular to each other. The Everard and Birksgate Ranges consist almost entirely of eruptive granite, as also the main mass of Barrow Range. However, outcrops of granite were observed which possessed a somewhat metamorphic character; but these were generally as outliers of the main ranges, and very probably belong to the schistose series overlying the eruptive granite.

The eruptive granite is generally poor or destitute of mica, its substitute being either hornblende or epidote; felspar crystals are prevalent, they are generally colourless or milky white, but are of a yellowish red when found on the surface.

Diorite. As already mentioned, p. 77, the granite is very frequently intersected by dioritic dykes; they prevail in the country between Mount Gosse and Barrow Range, and in Cavenagh Range the hornblendic eruptive rocks reach their maximum of development, as these hills are entirely composed of them. In the Cavenagh Range there occurs a diorite which has a stratified structure, not only petrographic but also architectonic, but in spite of this I do not hesitate to pronounce it eruptive, as I attribute the parallel position of the pyroxene crystals to a kind of macro-fluctuation structure. The dioritic

intrusions do not appear to have metamorphosed the granitic rocks in the slightest degree, except at one place, where a binary granite was found enclosed between two dykes of diorite, whereas the granite exterior to the dykes is of the usual composition.

Less frequent of occurrence and not largely developed, there were found the following varieties of eruptive rocks :

Diabase, intersecting granite and diorite.

Eurite, as ill-defined intrusions in granite.

Syenite is fairly developed in Skirmish Hill and Mount Squires ; it forms a transition between porphyritic syenite and typical syenite. The outline of the hills of syenite is less bizarre than that of the granite hills. The glens and valleys among them have every appearance of tectonic, and not erosive origin. The syenite, as also the granite, carries sometimes veins of epidote and epidote-rock (epidosite).

Porphyrites in several varieties occur at Skirmish Hill.

2. Volcanic Rocks.—A dark aphanitic rock, forming the top of Mount Squires, may be referred to under this head ; it seems to have penetrated the diorite. It resembles closely Tachylite, though I hesitate to name as such, not having examined it microscopically.

3. Tuffaceous Rocks —Surrounding Skirmish Hill, porphyritic tuffas were found alternately with porphyritic breccias and claystones ; they resemble closely a claystone (porphyrtuff) occurring at Rochlitz, in Saxony, which carries also small veins of lithomarge as a secondary product of decomposition, as does also the claystone in question.

4. Extra-limital Volcanic Rocks.—Two specimens of the well-known obsidian bombs, and of the usual shape were collected, one at Birksgate Range and one near Mount Squires. No clue could, however, be obtained as to the original site, or in explanation of their wide-spead occurrence.

III.—MINERAL-PROSPECTS.

As the Everard, Tomkinson, Cavenagh, and Barrow Ranges consist almost entirely of eruptive, generally granitic, rocks, it may be readily understood that they do not warrant any prospects for minerals. Moreover, the scarcity of water (which is insufficient in quantity for gold-washing on a large scale) and the almost certain absence of any kind of surface-indications of veins or lode-formations in these mountains are most unfavourable circumstances. Furthermore, the extensive cover of sand and loam which allows only the uppermost and steepest parts of the ranges being seen, is in itself a great drawback to prospecting.

The marquee-shaped hills forming the Palæozoic belt, which

bounds the Azoic rocks of the main upheavals on the south, may give more encouraging prospects. Considering, however, that they are of the same age as the hills and ranges to the east of Everard Range, it would be superfluous to search them for the precious metals until the former, which are more favourably situated, have been proved to be metalliferous.

IV.—SUBTERRANEAN WATER-SUPPLY.

During our sojourn in this country water was obtainable only from open rock-holes. Only on one occasion was there secured a small supply by shallow sinking in a creek-bed near Mount Watson. It must be remembered, however, that all the creeks have very short courses, and, debouching on the plains, are lost at once in the sand; but here the precious fluid may be obtained by sinking wells. As the ranges are seldom continuous, though of course connected underneath, large subterranean basins serving as receptacles for the surface-water must occur in the depressed intervals. The denser vegetation and better herbage in the wide valleys lend support to my conjecture.

A more feasible method of obtaining a permanent supply of water is, I think, by the construction of dams. The short and not-too-strong running creeks would allow of strong dams being built on a rocky foundation.

Splendid sites for conserving water by means of excavated tanks are not infrequent; but I do not think water in any quantity will be obtained by sinking in the bed-rock.

CHAPTER III.

From Barrow Range across the Great Victoria Desert to the Fraser Range.

I. PHYSIOGRAPHY.

This area on this line of traverse may be best described as the most westerly part of the Great Australian Mesozoic basin. Neglecting the cover of Tertiary deposits, although so abundant, and a limited outcrop of metamorphic schist about half-way across the desert, the Mesozoic rocks extend from the Townsend Ridges to the ranges west of Victoria Spring.

The country explored represents, as regards contour and general appearance, a very uniform dismal aspect, sand-plains and sand-hills are the chief features of this division.

The outcrops of Mesozoic rocks are very scanty, but wherever found they seemed to belong to a system of terraces, having a general N.W. and S.E. trend, their strata dipping at a low angle

to the north-east. The southern escarpment is less frequently concealed than the northern one. Though no actual contacts were observed, yet it is highly probable that Palæozoic rocks underlie this Cretaceous basin.

After leaving Mount Squires, a series of quartzite hills was passed, being the continuation of the Townsend Ridges, which could be dimly seen towards west. They have steep, almost perpendicular slopes, and approximate mostly in shape to the Marquee Hills. This formation is distinctly different to the one to be mentioned later, which also consists of quartzites and sandstones, but the form of these ridges and ranges is more of the Table Hill shape.

After crossing the Townsend Ridge, the country shows for the next 36 miles nothing but irregular sand-hills, alternating with widespread outcroppings of travertine and chalcedony rock.

The height of this stretch is between 1,000 and 1,200 feet above sea-level. A clay-pan (Camp 38) signifies, probably, the outer edge of the recent formation overlying the Devonian of the Tent Hill formation of the Townsend Ridges, and also the beginning of the Mesozoic basin, because for the next 150 miles the country, though different in its surface appearance on account of the more or less abundant cover of drift-sand or gravel plains, shows the same character, viz., quartzite terraces gradually descending towards south.

Between Camps 47 and 48, being about 150 miles from Camp 38, Tertiary formation was again met, consisting of nodular limestone with carbonaceous limestone-enclosures, also chalcedony, and a deposit of calcareous clay, apparently the result of mound-springs.

On proceeding further, another sandstone terrace was descended, and we entered wide plains with stunted growth on hard sandy soil or nodular limestone, but no outcrops of bed-rock were met with until between camps 53 and 54, a large dry salt creek was passed, on the south shore of which Palæozoic outcrops rise in cliffs of moderate height. (See fig. 8, pl. 4).

As this was in lat. 29°, and the formation distinctly trending towards E.S.E., it might be looked upon as portion of the Ooldea Range. Assuming this to be so, it would be a third parallel wave to the former mentioned Central Australian Archæan upheavals, extending as far as long. 124°, and rising out of the secondary rocks of this region.

From Camp 54 to Camp 60 (Queen Victoria Spring), for a distance of about 120 miles, the most wretched sand-hill country was traversed. There was no outcrop of anything like a bed-rock found, but only small travertine deposits.

In the valleys between the sand ridges gravel beds were sometimes found, but generally only of a coarse sand, more ferruginous than that composing the sand-hills. These sand-hills, especially N. and N.E. of Queen Victoria Spring, attain sometimes a height of 300 to 350 feet ; their trend being not only here, but all over the country passed through N.W. S.E.

Queen Victoria Spring is situated on the south-western boundary of the drift-sand area of Central Australia. These wind-drifted sand-hills reach their maximum in the sand-hills north and east of this spring of royal name, perhaps for the reason that as far as there the coastal winds of the Australian Bight are in action, counteracting the prevailing north-east winds of the interior, and thus forcing them to drop their burden of sand, causing in this way these immense accumulations spoken of before.

The height of Queen Victoria Spring is 830 feet above sea-level, though it is not the lowest depression thereabouts. Some 10 miles from Camp 58, a small claypan was crossed, the height of which was, according to the barometer, 700 feet above sea-level. The spring is situated at the base of these high sand-hills, in the middle of a small loamy flat, and occupies a basin some 20 yards in diameter (see fig. 11, pl. 5). Its bottom consists of a dark-blue clay. It does not deserve the name of a spring, but is simply a strong soakage supplied by the drainage of the high neighbouring sand-hills.

Having left Queen Victoria Spring, the country changed remarkably. Within the next 25 miles we ascended a ridge, striking N.S., consisting of quartzite, slowly rising to a height of 1,200 feet above sea level, abundantly covered with a fine brown calcareous loam or loess and extensive patches of nodular travertine limestone.

In a deep valley which was traversed afterwards (between C. 62 and 63) granite and metamorphic rocks were found exposed, and also slates and schists cut through by a multitude of quartz veins.

After passing a salt lake between C. 61 and 62 the country rises again, and quartzite- and granite-outcroppings are observable. Apparently another range was traversed, the barometer showing 1,150 feet, and soon after that the hornblendic schists of the Fraser Range were reached. This range is closely connected towards N. and N.E. with the heights mentioned above ; but as seen from the east it rises abruptly out of the plains. Its highest elevation, called the Peak, is 2,010 feet high, and 765 above the station hut. It is a splendid stock country, with abundance of well water.

II.—DESCRIPTIVE GEOLOGY.

Encircled towards south by the Tertiary deposits of the Nullabor Plains, and to the north bordered by the Azoic formation of the Central Australian upheavals, an area of Mesozoic formation extends apparently as far as long. 123°, at least in this region. It is extensively covered with drift sand and other recent deposits, and no high elevations exist there, only the southern precipices of the flat-topped hills being denuded from surface covers.

As far as it could be observed the dip of the Mesozoic strata, chiefly quartzite, was generally not exceeding 15 degs., and was found invariably towards N.N.E.

The height of this area varies between 1,300 and 700 feet. In the metamorphic ranges of the south, however, which seem to form a barrier towards the coast plains, the height rises to 1,450 feet, according to aneroid measurements, and falls after passing the Fraser Range, according to Mr. Lindsay's observation, gradually towards the coast.

Recent Formations.

The sand which covers so largely the area previously referred to is the result of the disintegration of the gritty quartzites and sandstones of the desert. It is generally loose and wind-drifted in places, though it is somewhat consolidated by means of a clay-cement, but only on the surface, because if the uppermost crust of a thickness of one or two inches is removed, the loose sand is again met underneath.

It was here where an interesting occurrence of æolian erosion could be observed. When this uppermost crust had been broken through, the wind had carried away the loose sand, leaving now and then mushroom-like forms of sand, consisting of a small layer of consolidated sand on the top, supported by a column-like neck of less-impregnated, and therefore less-compact, sand. Sometimes also the cover consisted of a flat pebble (see fig. 9, pl. iv.). The north-easterly part of these æolian formations was more excavated than the other parts, due to the prevailing winds of the interior.

The colour of the sand is generally reddish-brown, and consists, I should say, up to 95 per cent. of quartz, the balance probably being lime, as the moderate occurrence of small calcareous concretions in the sand may prove that there is some (lime), though not visibly present.

These concretions have a cylindrical form, a concentric radiated structure, and are composed of sand cemented together by calcareous matter. They represent probably infiltrations and

fillings of the tubes of decayed roots of trees, burrows of insects and other small animals.

Another specimen of æolian action, the only one in force in this country is this :—It was observed that sand-hills generally consisted of a white quartz sand of a very uniform grain; whilst the one in the valleys between the sand-dunes was found to be sand mixed with gravel, this sand having invariably a reddish colour, and giving a striking contrast to the red sand-hills. I should like to explain this fact by supposing the wind acts as a natural air separator, as the white, and therefore pure, quartz of a lower specific gravity has been removed easier by the wind than the ferruginous red quartz, which is of course of higher specific gravity.

The shape of the sand-hills is invariably the same as given in fig. 10, pl. iv. The north-eastern slope is convex, gradually rising; whilst the south-western one avers to the prevalent course of wind, and has a steep precipice of four or five feet in height, leading to a concave, gradually flattening, incline.

These sand-dunes are really all parallel to each other, and very seldom found confluent.

The repeated proofs of their instability was observable on account of gum-trees growing on top of the sand ridges. The roots of these trees were often sticking far out on the lee side of the dune, entirely exposed and uncovered, whilst the roots on the opposite side were buried deeply in the accumulated sand.

Where the sand-dunes are not grown over with vegetation, splendid ripple marks may be noticed, covering especially the highest part of the dunes, and representing in miniature a system of æolian formations, as the sand-dunes do *en gros*.

When destitute of vegetation, these sand-dunes can be seen extending sometimes in one long line almost as far as the eye can reach. Their height is on an average 60 to 70 feet, except in the southern portion of the great Victorian Desert, where, when approaching the Queen Victoria Spring, sand-hills of 300 feet were traversed. They were there, however, less regular, and more tumbled and confluent.

This, I have reason to believe, is probably due to disturbances of the ærial influence, for, as explained in the meteorological notes, a climatic boundary exists there, where the dry continental N.E. winds and the coastal winds meet, causing thus a higher rainfall, which was also able to create a strong soakage on a favourable spot such as Queen Victoria Spring has been at one time.

This meeting of two winds from opposite directions also affected the accumulation of such immense sand deposits as found there, by causing the continental winds, heavily laden with

sand, to drop its burden, only allowing the finest suspended particles to be carried further, which gave rise to extended *loess* deposits bordering the sand deposits to the south-west.

It will be remembered that sandstone ridges were described as occurring in this portion of our journey, covered with accumulations of a fine-grained loam. The only possibility of explaining its occurrence in this country is by assuming its origin as subærial.

As it was ascertained that the sea-winds are active as far inland as this, and that also a barrier of high ridges is to be found there, these facts in themselves make the accumulation of loess easily explicable.

How deep these subærial deposits are could not be ascertained. According to their levelling tendency it was found more copiously deposited in the valleys of the bed-rock, where it was sometimes found excavated apparently by running waters to a depth of four to five feet, showing on the perpendicular faces thus produced the genuine land-loess structure.

The occurrence of such distinct courses of superficial water also points strongly to an uncommonly plentiful rainfall, produced, as explained above, by meeting of land and sea-wind.

Minor features of the surface formation of this section are :—

Claypans.—They were of moderate extent, and few in number. It will be remembered that when leaving the Devonian formation of the Sutherland Ridges, and entering the formation which has been taken as Mesozoic, claypans were mentioned as occurring thereabout. They also were met before and after crossing the metamorphic rocks described as occurring between Camp 53 and Camp 55, and again when leaving the Mesozoic formation, and entering the Palæozoic formation after having passed the Queen Victoria Spring. There they were partly covered with efflorescent salts, leading to so-called salt-lakes.

Should not the constant occurrence of claypans on or near the boundary of the sedimentary and the metamorphic formation point to an ascent of subterranean waters, which finds its way to the surface along the joints of the bed-rocks.

Even if it should not terminate in an actual egress of a spring, a perpetual wetness of stratified rocks must lead to a minute disintegration of its particles of physical action, as, for instance, freezing of its interstitial waters, as well as chemical action by depositing the saline matter by volatilizing, and forming thus a deposit of clay, gypsum, and salt, a combination of minerals of which all the claypans and salt-lakes consist.

The occurrence of an extinct mound-spring within the neighbourhood of claypans also points to an efflux of subterranean waters, which was one time even strong enough to penetrate to the surface in a continuous flow.

I have no doubt that the claypans and salt-lakes in the country described in this section originated in this way, but I have not the slightest intention of pronouncing all the salt-lakes as being of terrestrial origin.

By far the greatest number of them, and especially those met on the granitic high plateaux in Western Australia, are undoubtedly of oceanic origin.

Travertine Limestone.—The crust limestone was found in this region as well as in parts of the country already traversed. It was found invariably as a kind of a substratum of the sand deposits, and was always, if outcropping, an indication of the vicinity of sedimentary rocks. In the more arid parts of the great desert, that is to say, north of Queen Victoria Spring, the travertine was found compact, showing however, on breaking it a globular structure. In the country south of this spring the limestone nodules are found lying about loose, sometimes in big heaps, They vary in size from a pea to a hen's egg, are frequently perfectly spherical, and contain very often a nucleus of the underlying bed rocks. These nodules are the result of the disintegration of the compact travertine mentioned above.

Gravel Plains.—Gravel plains are hereabout of moderate extent only. The gravel consists of the derivative material of the chief component of the Mesozoic formation, namely, ferruginous sandstone. The abundance of drift-sand would not permit of anything like a widespread plain.

II.—MESOZOIC.

The formation which has been pronounced as Mesozoic consists in the following descending order, as observed on the outcropping terraces, of—

(1) Clay (indurated).
(2) Jasper rock.
(3) Conglomerate.
(4) Quartzite (desert quartzite).
(5) Sandstone.

The *Sandstones* and *Quartzites* are the main feature of the formation. They have been already referred to as escarpment-forming wherever they have been found. Lithologically they are in great variety, though they are generally close-grained and contain occasionally minute laminæ of mica. They are very tough before decomposition sets in, on account of the felspathic cement they contain, but when found somewhat advanced in decomposition the cement is more argillaceous.

Jasper and *Porcellanised Sandstones* are the next prominent feature in this formation. The gravel and gravel-conglomerate

found in the plains between the sand-ridges consist chiefly of this material, having in this state a thick coating of ferruginous matter.

Conglomerates were found on several of the aforesaid terraces. The component pebbles consist of quartz rock and lydite, and seemed to be consolidated only in a slight degree, as they were seldom encountered cemented together, but lying loose, and covering the base of the rises.

The indurated clay was found covering argillaceous sandstone in one place. The thickness of the stratum, however, seemed to be limited as far as the covering sands would permit of examination.

A mudstone occasionally cementing together the rubble of the underlying rocks, and found surrounding the water holes near Camp 40 and Camp 44 is of a secondary fresh-water formation, and of no intrinsic value.

Well aware of the insufficiency of ranging a series of sedimentary rocks under a certain geological formation only on account of the lithological character, as it was done in this case, it must be acknowledged that the lithological and stratigraphical features of the Mesozoic (Cretaceous) formation are in agreement with those of the typical area in Australia. Moreover they resemble the Cretaceous deposits met with in the early part of our journey, which have been proved to be of that age by means of fossils.

III—PALÆOZOIC.

Their first occurrence was between Camp 53 and Camp 55, and the second occasion towards the end of this part of the journey, when approaching the Fraser Range.

The Palæozoic rocks at the first-named spot formed a moderate high line of hills of a distinct north-east and south-west trend, the dip being 70° to 80° south (see fig. 8, pl. 4). Where this formation was traversed it was about 25 miles wide, the greatest breadth, however, seemed to be east and west with the trend of the hills. They consisted of garnetiferous gneiss, mica schist, pegmatite, and a breccia of the rubble of these rocks cemented by a siliceous material. The last is of course of secondary formation only.

There is not much to say about the lithological character of these rocks, but as regards their occurrence in this latitude they are of some interest.

As it has been demonstrated by Professor R. Tate in his report on an exploration into the Bunda Plateau, the older Tertiary deposits of this region rest on a Palæozoic basin, whose protuberances emerge above the overlying Tertiaries as far as can be seen at Yatala, Fowler's Bay, Pedinga, Ooldea, and Boundary

Dam, I should think that the outcrop of metamorphic rocks referred to above represents a continuation of this Palæozoic margin which there may have reached it furthest west, and turns thence down to Point Culver.

Concerning these protuberances, which are, according to the gentleman above quoted, granitic, such is not the case in the outcrop in question, though there is little doubt that this formation of the country referred to points strongly to a granitic substratum, which may even outcrop at no great distance from where we crossed that formation.

Taking it for granted that a line of such formation exists, extending from long. 125°, by Boundary Dam to Ooldea, it would form there, as has been hinted in a former chapter, another undulation of Azoic rocks running almost parallel to the one referred to in Section II., and furthermore this margin of the older beds would form a dividing line between two extensive subterranean basins, the one to the north forming a receptacle for the *Mesozoic* strata, sedimented in it with a fringe of Palæozoic rocks along the northern end, and the southern basin with the cainozoic sediments of the Bunda tableland.

Another, and far more extensive, Palæozoic country is repreпresented by the Fraser Range.

Geographically speaking, this range is very limited, as the portion rising to a perceptible height is not more than 15 miles in length, and about six or eight miles in width, but geologically it extends over a wide area, slight undulations being only perceptible, but geognostically closely related to the Fraser Range.

This country was entered soon after leaving Camp 62, and the rocks comprising this formation were talcose and micaceous schists, feldspatic rocks, and chiefly siliceous slates and quartzites.

The main mass of the Fraser Range consists of hornblendic schists indistinctly stratified, and apparently representing an older underlying stratum of more distinct stratified siliceous rocks of the outlying portions (see fig. 12, pl. 5).

In one part of the range, namely, on the way to Simon's Hill from the Station Hut, an interesting occurrence of granitic dykes was observable. They are moderately high, with wall-like perpendicular sides running parallel to each other for a very long distance. As this granite is inclined to split in rectangular blocks, these dykes have the appearance of ruined walls of houses in a street in an ancient town. (See fig. 13, pl. 5).

Generally speaking, as regards eruptive rocks piercing the schistose formation of this eastern part of Western Australia, there were none met with of any extent or importance. The Fraser Range proper, which I inspected closely, exhibits only moderate signs of eruptive disturbances.

Besides those above-mentioned granitic dykes, only a few pegmatite protrusions were observed there. It remains to be observed here that also in this part of our journey two specimens of obsidian bombs were procured—one in the Great Victorian Desert amongst the sandhills, and one at the Fraser Range.

III.—MINERAL PROSPECTS.

Regarding the mineral prospects of this country, only the two Palæozoic patches are worth consideration here.

Concerning the one between Camps 52 and 54, it must be remembered that this, although a promising piece of country, is at present too far from any civilized place to be much thought of as a prospecting ground.

On the other hand, the Fraser Range and its highly mineralised surroundings afford the highest possible chances for being vigorously worked by prospectors.

It is situated only about 130 miles from the sea coast, from which a well-beaten road, with several wells, is available for the whole distance.

The range itself boasts, thanks to the energetic manner in which the owners of the place have improved their property, of many good wells, dams, &c., with abundance of splendid water.

This place could be made a kind of a centre, from where prospecting parties could start, and fall back upon if necessary, in case of want of water, &c.

The country north and north-east of this range is of a highly metalliferous character.

Even by the cursory inspection, which was all that was possible owing to our method of exploring, I was able to find any number of quartz-reefs, which I should have liked to examine more closely. Not only gold will be found in this country, but also other precious metals, as, for instance, silver, as there are highly-promising indications of it.

There are many big blows of manganiferous ironstone which, I should say, are well worth thoroughly testing.

Considering the fact that this metalliferous area is bordered to the north by the Hampton Plains, an excellent piece of country for pastoral and even agricultural purposes, it is a double recommendation towards attempting the opening up of the back lands of the Fraser Range, with a view of developing its mineral wealth.

IV.—SUBTERRANEAN WATER-SUPPLY.

As has been hinted above, the country between Fraser Range and Victoria Spring seems to be favoured with a moderately high rainfall, influenced by the relative proximity of the sea. In addition to this, the favourable physiographical conditions of this

area, viz., undulating stratification of the metamorphic bed-rocks, will render this country very promising for obtaining water by sinking wells down to the bed-rocks. A well near Simon's Hill, where this was done, proves that this method of obtaining water would be crowned with success in other places.

Concerning the waste track north of Queen Victoria Spring, although the conditions for subterranean, even artesian, water are favourable, on account of its geological and stratigraphical configuration, the question arises *cui bono?* should that task, although promising, be undertaken?

The greatest part of this sandy desert will remain for ever what it is now, an inhospitable, dismal stretch of country.

CHAPTER IV.

From the Fraser Range to the Yilgarn and Murchison Goldfields.

PHYSIOGRAPHICAL FEATURES.

This large area may be treated as one, on account of its geographical uniformity. It comprises an immense high plateau, which extends towards the west, far into the settled districts of Western Australia, terminating there in a steep escarpment, of which the Darling Range forms the most prominent feature. From a geological point of view this same stretch of country is sub-divided into several formations, of which the granitic and the flanking schistose are the most developed.

The height of this vast granitic tableland may be averaged, according to the barometrical measurements, at from 1,300 to 1,400 feet. The lower levels of this area are covered with immense saline sheets, which are generally surrounded by large alluvial flats and plains covered by nodular ironstone.

The plains are interrupted by bold eruptive granite-masses in low sandstone-capped ridges.

Rivers or creeks were not met with, and the big salt lakes (as Lefroy, Seabrock, Moore, Austin), appear to have no outlets, which fact accounts for the thick crust of salt with which they are covered.

The mountains and hills in this portion of the country cannot be said to boast of any great height or extension, as with the exception of the moderate outcrops of the elevated granite tableland which represent the main formation of the south and south-western part of West Australia; there are, as already mentioned, only low ridges of schistose rocks in the northern portion, which are often found in connection with flat-topped sandstone ranges.

The land surface of the country travelled over may in brief be

described as follows :—Proceeding from Fraser Range in a north-westerly direction, towards Lake Lefroy and the Hampton Plains, long-stretched ranges of metamorphic rocks were traversed. They have a general trend N.E. to S.W., and reach a height of 1,200 to 1,500 feet. Towards Lake Lefroy, between Camp 72 and Camp 76, wide claypans and salt lakes are found in the lower levels between the ridges. These salt lakes extend far towards the east, and are probably connected with the chain of salt lakes which were passed *en route* to the Fraser Range. The height of the smaller ones above sea-level is on an average about 900 feet, whilst the bed of Lake Lefroy is 1,000 feet above sea-level. All the salt-pans occupy boggy ground, and are therefore difficult to traverse, especially for heavily loaded camels. Most of them are bordered by low cliffs, consisting of a siliceous breccia of a secondary shore-formation.

Lake Lefroy, which has its inlets on the north shore, is on its southern side bordered by a line of hills of eruptive rock. The cover of salt is in places, viz., two to three inches thick ; but this extreme thickness I consider to be due to the accumulation of *drift salt*, an occurrence which was observed more distinctly at Lake Deborah, where considerable accumulations were heaped up on wind-protected places. North and north-east of Lake Lefroy the so-called Hampton Plains begin, which extend in that direction. This is a splendid stretch of country, a slightly undulating flat land, rising only at Mount Monger and the neighbouring hills to a moderate height, about 1,700 feet above sea-level, or some 300 feet above the general level. The hills as well as the whole of the bed rocks of the Hampton Plains consist of schistose rocks, with an abundance of quartz and ironstone lodes, the whole being traversed here and there by eruptive, mostly dioritic, dykes.

The soil is hereabout of an excellent quality, being a loam composed of the decomposition products of the schist and plutonic rocks of the vicinity,

By travelling from here, Camp 76 (Hunt's Well), in an easterly direction towards Yilgarn, an entire change in the country was observed after passing the Depôt Hill of Hunt. Here the typical Western Australian granite-country was entered for the first time, *i.e.*, boundless flat country, either of hard sandy soil and covered with dense Eucalyptus forests, or strewn with gravels and clay-stones, and in this case covered with stunted vegetation. Through this sand-soil the underlying granite rises occasionally in large masses, and attains various heights from 300 to 400 feet above the plains (which are on an average 1,500 feet above sea level), thus breaking the monotony of the surface-contour.

From the western edge of the Hampton Plains to the immediate vicinity of Southern Cross, a distance of about 150 miles, the country is of this same character, except that in the latter portion the lower levels include many salt-covered lake basins and claypans. The lowest portion of this depression of 950 feet above sea-level was reached at Yilgarn, at the shore of Lake Deborah.

The Yilgarn Hills are a low range, their general direction being north and south, having along their eastern base a chain of salt lakes.

Near Yilgarn the auriferous schistose formation was entered again, and this by travelling towards N.N.W. was left shortly after our having passed Golden Valley.

After leaving the Yilgarn Hills, by proceeding in a N.N.E. direction the granite tableland once more appears. The sand and gravel plains begin again, with no other break than here and there high masses of eruptive granite.

This kind of country was found continuous (by travelling in a N.E. and N. direction) as far as Mount Kenneth, which means that for a distance of 125 miles the character of the country was the same.

Before reaching Mount Kenneth and its surrounding heights the Warne Flats were traversed—a fine piece of country, fit even for agricultural purposes.

Mount Kenneth is a table-topped sandstone cliff of moderate height, but of rather lengthened extent. There are several of these flat-topped hills noticeable towards N. and N.E., and also low, flat, sandstone-capped ranges, one of which was crossed before descending down to the Warne Flats (Camp 97-8).

Travelling from Camp 101 in a westerly direction schist country was again entered. Quartz and ferruginous quartz veins are very plentiful, and the country has a very promising appearance from a prospecting point of view. These schistose rocks strike N. and S., and the Canning Hills (Mr. Broad's Station) are the highest elevation of this formation.

From Broad's Station we travelled again north, or nearly so, and the country passed through was again sand plains and bold granite hills. At Jones's Station the schist country was touched again in Mount Magnet, it being the continuation of the Canning Hills to the North.

Between Jones's and Townsend's Station, which latter was reached afterwards (the two places being only some 50 miles apart), only granitic bed-rocks were met with, whilst to the east Lake Austin was visible, bordered by low, apparently schistose, hills. This latter formation was found outcropping again a few miles beyond Townsend's Station, and the low ranges composed

of this formation, still striking N.S., continue as far as Annean Station where they carry the Annean Reef, the first gold reef discovered on the Murchison.

DESCRIPTIVE GEOLOGY.

Fundamental Rock Structure.—Exclusive of the recent and superficial deposits, the general geological configuration of the country may be best described by assuming as foundation two massive masses of granite, forming slightly undulating high plateaux, which are bordered, one of them to the E., and one to the N. and E., by low hills composed of crystalline metamorphic rocks. One of these masses, the smaller, extends from the Yilgarn Hills to the east as far as the Depôt Hill of Hunt (near Camp 77), from which point eastwards the granite is overlain again by metamorphic rocks, which is probably the case also to the north and south. The other granite mass, the larger, extends from Yilgarn northwards as far as Townsend Station, and is flanked on the east by a belt of schistose rocks. How far this belt extends towards the east is not yet known, but if it should not be continuous I should think that slaty rocks *prevail* in this region just as the granites do to west of our route, where the slate formation, according to Mr. H. P. Woodward, Government Geologist in W.A., in his report on this country, and also according to Rev. W. B. Clarke, in his "Sedimentary Formations of N.S.W.," only occurs in patches.

Cainozoic Rocks.—The following recent formations to be found in this part of West Australia are:—

Sandy Plains.—These are the chief features of this tract of country, and they consist either of a fine loose sand, or, more frequently, of a hard loamy sand. In the latter case they give rise to splendid vegetation and high timber, whilst that on the first-mentioned kind is in every sense entirely useless. In the Murchison District the sand of these plains is found consolidated to such an extent that it can be used as a building stone. It is three to five feet under the surface where this recent sandstone is found in layers of five to ten feet in thickness, interstratified in places by a semi-opaline sinter, and almost invariably, and chiefly at a shallow depth, it is found to be water-bearing.

If freshly broken this sandstone is very friable, but hardens quickly by exposure to the air, a circumstance which points to the presence of a fair amount of calcareous matter besides silica. The sand forming these sand-plains may be taken as the derivative material of the "Desert Sandstone" which still covers vast tracts in the interior. Immense areas also are covered with sand and gravel, consisting of ferruginous sandstone and claystones. They have a widespread occurrence between the Lake Lefroy country

and Yilgarn, and also between Golden Valley and the country around Mount Churchman. They occur in belts or patches between the sand-plains, and are often 10 to 20 miles across. On account of the scarcity of vegetation, they represent a very dismal aspect.

The "*crust limestone*," or travertine, is of comparatively rare occurrence. It is limited to the beds of watercourses, and is found there only in very moderate thickness. In a creek near the Waterhall Mine, at Golden Valley, it was found exposed to a thickness of two feet.

Salt Lakes.—All over this portion of the country were encountered numerous and extensive, what are generally styled, "salt lakes," to which reference must here be made. In a former chapter I essayed to explain the terrestrial origin of some of the salt lakes in or near Mesozoic deposits; but such origin is not applicable to the salty claypans of the West Australian high plateau. There is little doubt that these large flats, covered with efflorescent salts, represent depressions of the granitic upland, in which the saline matter remaining from isolated, and in due course of time evaporated, parts of the ocean, has been accumulated. As they have no outlet at all, or only one at a very high water-mark, the saline matter remains, and a proof that this granitic upland has been raised from below the level of the sea, the widespread occurrence of the sandstone cappings of these granitic rocks may be adduced.

These wide lake-basins are surrounded either by large clay-flats or, as it was found in the southern portion of this section, by low cliffs consisting of a hard silicate of magnesia-rock. This formation signifies most likely ancient deposits of these lakes.

As a minor feature, may here be mentioned *deposits of guano* in caverns and rock-holes of the numerous granite rocks of this country, which have most likely accumulated there through bats and wallabies using them as shelter.

"Desert Sandstone."—As a transition to the older formations we may be regard the sandstone which caps the crystalline hills, especially in the more northern parts of this section. This formation was encountered firstly when descending towards the Warne Flats, which are bordered also to the east and north by hills of the same formation. This sandstone overlies directly the granite, and is invariably horizontally-bedded; its thickness varies from about ten to 200 feet on the hills round Mount Kenneth. As the lower portions of this sandstone are more inclined to weathering than the upper, these form overhanging escarpments, with numerous caves at the base of them. Big hungry-looking quartz-blows in these sandstone deposits occur frequently, being only infiltrations of siliceous matter, as they

are often found in sandstone country, and therefore, of course, of no value. Fossils were not found in this formation, but it is probably identical with the "desert sandstone" of the Northern Territory of Australia.

Pàlæozoic or Archæan Rocks.—The main components of the crystalline rocks are the hornblendic schists and slates in different varieties. They immediately overlie the granites, and are overlain by the feldspathic schists and quartzites of the same formation. In this order of superposition they were found outcropping by travelling in a north-easterly direction from Fraser Range, where they are well developed, and also eastwards of the Annean. As components of less importance of the same formation must be mentioned here talcose and micaceous schists, whilst on the other hand a siliceous ironstone, locally called "jasperoid," is constantly and largely developed in this series. The latter is a frequent occurrence in auriferous country. The quartzites occupy also a prominent position amongst the Palæozoic formation. They are mostly of a hard glassy character, with a bluish tint; the gritty variety though is also found, especially eastwards of Yilgarn. The quartzites and the underlying feldspathic and hornblendic schists seem to be comformably stratified, and are only in a small degree disturbed from their horizontal stratification.

Plutonic.—The immense area occupied by granites represents this formation. Wherever outcropping they bear a most distinct eruptive character. Of a dome-like form and of moderate height, say, on an average, about 200 feet, they often show signs of a macro-fluxional structure, the big curves formed by the white feldspar crystals being strikingly discernible. They are frequently traversed by quartz veins or dykes of a magma differently grained to the main mass, but these veins, of course, are of no importance from a prospecting point of view. A puffing up of big pieces, or a peeling off of scales of these granites, which is of common occurrence, may be due to the action of a sudden change of heat and frost, a dynamical factor of great importance in this country. Generally these granites are poor in plutonic intrusions, and if they occur, they are of a dioritic nature.

Plutonic and trappean rocks other than diorite are found in the country round Lake Lefroy. There diabase and diabase-porphyry occur. The Parker Hills, on the south shore of Lake Lefroy, are at their eastern end composed of the latter material, and the former form huge dykes in the above-mentioned country, also occasionally they appear rising in bizarre mases, through the basins of the salt lakes of this country.

The Canning Hills (Mr. Broad's Station) show signs of frequent plutonic intrusions, and deposits of detrital eruptive

material of considerable extent (porphyry and diabase tuffa) were also found there.

MINERAL PROSPECTS AND WATER SUPPLY.

From the foregoing account of the widespread occurrence of metamorphic rocks it will be readily and rightly concluded that this country is of a *highly promising metalliferous character.* An auriferous area extends from the Fraser Range northwards to the Hampton Plains, and as belts of the same material most probably border the granitic elevation between the Hampton Plains and Yilgarn to the south and north, this same formation will be found to extend as far as the latter country.

The area to N. and N.E. of Lake Lefroy, however, had the most promising appearance to me, and I may safely say that the country round Mount Monger will yet be famous as a goldfield. Northwards again, between Mount Kenneth and the Canning Hills, the same promising signs for the presence of precious metals were observable. It is a spur of the belt of metamorphic rocks extending northwards from Yilgarn. There, as well as further northwards towards the Murchison District, the gold-bearing character of this formation is known, and there is little doubt that it will prove so all along this belt of metamorphic rocks.

In regard to the granitic country, there is no likelihood of minerals or metals being found there, but as these probably represent the hard lower portions of this formation which will, no doubt, be overlaid by softer metamorphic granites forming the transition to the true metamorphic schists of this area, there is, if these be found, a chance of encountering also metalliferous veins in them. Unfortunately the prevalence of the abundant covering of sands and loams encompasses these over-lying softer portions and renders prospecting for them almost impossible.

Water.—The uncertainty, however, of obtaining valuable water-supplies presents a less pleasant outlook. In the northern portion of this section there is a fair amount of water, although sometimes brackish, to be obtained by shallow sinking in the alluvials. The settlers of the north-eastern district have already been successful in this respect, and this will be the only practicable method for that purpose. In the southern portion, however, though having a higher annual rainfall than the northern, the conditions for obtaining water in the alluvial deposits are less favourable, but as there are a number of granite bosses, which afford favourable sites for constructing dams, this method will have to be applied, in addition to sinking wells in the immediate vicinity of these rocks, where water will often be found stored in subterranean receptacles formed by the granites.

In the whole of this section there is, of course, not the slightest chance of obtaining water on the artesian principle.

CHAPTER V.

LIST OF ROCK AND MINERAL SPECIMENS

I. Specimens characterising the rocks comprising Mount Chandler and vicinity. May 29-31, 1891. (Palæozoic Devonian).

II. Chief rocks of the formation between Cootanoorina and Arcoellina. May 3-25, 1891. (Cretaceous).

III. Specimens of the most prominent recent bed rocks between Warinna and Cootanoorina. May 2-3, 1891.

1A. *Hornblendic granite.* Main mass of Everard Range. June 2, 1891.

1B. *Epidote-diabase.* Forming dykes in Everard Range. June 4, 1891.

1C. *Granite.* Low ranges surrounding the Everard Range. June 3, 1891.

1D. *Travertine-limestone.* Gullies and Watercourses. Everard Range. June 4, 1891.

1E. *Epidote.* Small veins in granite mass of Everard Range. June 3, 1891.

1F. *Diorite.* In huge masses west of main mass of Everard Range. June 6, 1891.

1G. *Diorite* Dykes in granite hills S.W. of Everard Range. June 6, 1892.

1H. *Diorite*, from small veins intruding the lower parts of main mass of Everard Range. June 6, 1891.

1I. *Siliceous sinter.* Gullies and watercourses in Everard Range. June 5, 1891.

1K. *Semi-opaline sinter.* Gullies and watercourses of Everard Range. June 4, 1861.

1L. *Specimen of œolian-eroded surface of granite rock.* Everard Range. June 4, 1891.

IV. *Specimens* collected by Messrs. Lindsay and Helms on *flying-trip* south from Camp 4. June 15, 1891.

(*a*) Within Camp 4 and 12 miles.
(*b*) Within 12 and 30 miles.
(*c*) Within 30 and 50 miles.

2. *Granite, metamorphic.* Rocks and boulders west of Everard Range. June 7, 1891.

3. *Travertine breccia.* Tavertine rubble and quartz cemented by red travertine. Eight miles west of Camp 1. June 7, 1891.

4. *Granite.* Twelve miles west of Camp 1. June 7, 1891.

5. *Travertine-limestone.* Eight miles west of Camp 2, forming banks along Ferdinand Creek. June 8, 1891.

6. *Black travertine* stained with absorbed vegetable matter. June 8, 1891, near Ferdinand Creek.

7. *Sand* from the Ferdinand Creek. June 8, 1891.
8. *Metamorphic hornblendic rock* (decomposed). Ten miles west of Camp 2. Overlaid by travertine-lime. June 9, 1891.
9A. *Nodular* and *tabular limestone.* Five miles west of Camp 3. Terraces along Ferdinand Creek. June 9, 1891.
9B. *Travertine,* partly replaced by opal-quartz and opal. Near depôt Camp 4. On base of granite rocks. June 10, 1891.
10. *Gneissic granite.* Low hill two miles N.W. of Camp 4. June 10, 1891.
10A. *Granite.* Same locality. June 10, 1891.
10B. *Diorite,* piercing granite. N.W. same locality. June 10, 1891.
11. *Granite* (decomposed). Small hills between Camps 4 and 5. June 18, 1891.
11A. *Diorite.* Same locality as No. 11. June 18, 1891.
11B. *Travertine* (including debris of rocks). Base of small granite hills between Camp s4 and 5 June 18, 1891.
12. *Quartz, hornblende, felspar.* Small veins in granite hills between Camps 4 and 5. June 18, 1891.
13. *Lodestone* (lode five feet wide). In granite hills between Camps 4 and 5. June 18, 1891.
14. *Travertine.* In banks running N.S. escarpment E. Between Camps 5 and 6. June 19, 1891.
14A. *Chalcedony.* Embedded in travertine (14). June 17, 1891.
14B. *Travertine,* with absorbed organic matter. Banks between Camps 5 and 6. June 19, 1891,
15. *Diabase.* Intersecting a diorite outcrop. Nine miles west of Camp 6, June 22, 1891.
16. *Guano-incrustation* of rock-holes (bats). Granite rocks near Camp 6. June 22, 1891.
17. *Diorite.* Low hills near Camp 9. June 24, 1891.
17A. *Epidote.* Intersecting low diorite hills near Camp 9. June 24, 1891.
18. *Felspathose grit.* Faulted country near Camp 10. June 29, 1891.
19. *Veinstone.* Five miles east of Camp 11. Low range. June 29, 1891.
20. *Quartzite.* "Coffin" Hills, near Camp 12. June 30, 1891.
21. *Travertine,* as cement of gravel conglomerate. Two miles N.W. from Camp 12. July 2, 1891.
22. *Granite,* with *travertine*-incrustation. Low Granite Range. Camp 14. July 4, 1891.
23. *Gneissic granite.* Birksgate Range and surroundings. July 12, 1891.
24. *Epidote-granite.* Birksgate Range. July 8, 1891.
25. *Quartz-lode.* In Mount Sir Thomas. July 17, 1891.

25A. *Felspathose rock*, with *quartz-vein*. Low Range. Camp 14. July 4, 1891.
26. *Diorite* (hornblende-rock). Small veins in granite of Mount Sir Thomas. July 12, 1891.
27A. *Granite*. Lowest stratum of Turban Hill. July 7, 1891.
27B. *Granitic rock*, with embedded subangular granite debris. Same hill, second stratum.
27C. *Quartz* pebbles of a conglomerate. Same hill, third stratum.
27D. *Silico-felspathic rock*. Same hill, fourth stratum.
27E. *Ferruginous quartzite*. Same hill, fifth stratum. July 7, 1891.
27F. *Whitish quartzite*. Turban Hill, top layer. July 7, 1891.
28. *Argillaceous travertine*. Gullies of Birksgate Range. July 12, 1891.
28A. *Gypseous clay*. Gullies of Birksgate Range. July 12, 1891.
29. *Binary granite* (microcryst. quartz, microcryst. felsp.). Sawback Hill (Mount Gosse?) July 17, 1891.
30. *Travertine*. From Boundary Hill (Mount Gosse). July 18, 1891.
31. *Granite*. From Boundary Hill. July 18, 1891.
31A. *Eurite*. From Boundary Hill. July 18, 1891.
32. *Scaly quartzite* (lustre due to minute lamina of mica. Grinding-stone of blacks not found in situ). July 20, 1891.
33. *Porphyritic syenite*. Main mass of Skirmish Hill. July 21, 1891.
33A. *Porphyrite*. Dykes in Skirmish Hill. July 20, 1891.
33B. *Porphyrite*. Intrusions in Skirmish Hill. July 20, 1891.
34. *Porphyritic tuffa*. Surroundings of Skirmish Hill. July 20, 1891.
34A. *Porphyry-breccia*. Base of Skirmish Hill. July 20, 1891.
34B. *Porphyry-claystone*. Base of Skirmish Hill. July 20, 1891.
35. *Agate*. In porphyry rocks of Skirmish Hill. July 20, 1891.
35A. *Semi-opal*. From Skirmish Hill. July 20, 1891.
35B. *Quartz crystals*. Skirmish Hill. July 20, 1891.
36. *Specimens* of rocks from a *flying trip* towards south collected by Mr. L. Wells. July 25, 1891.
37. *Porphyritic diabase* and *quartz* vein intersecting the diabase. Western parts of Skirmish Hill. July 26, 1891.
38. *Diorite*. Main mass of Cavenagh Range. July 29, 1891.
39. *Diorite* (bell-rock). Cavenagh Range. July 29, 1891.
39A. *Aphanitic diorite*. Cavenagh Range. July 30, 1891.
39B. *Quartz epidosite*. Cavenagh Range. July 30, 1891.
39C. *Aphanite*. Cavenagh Range. July 30, 1891.
39D. *Felspar*, with specks of *hornblende* (vein forming material) Cavenagh Range. July 29, 1891.

39E. *Semi-opal*, with *hornblende* (small veins). July 29, 1891.
39F. *Quartz*, as lode in hornblende rock. Cavenagh Range. July 29, 1891.
40. *Tachylite.* Mount Cooper, Cavenagh Range. July 31, 1891.
41A. *Granulite.* Ten miles east of Camp 33, Barrow Range. August 3, 1891.
41B. *Granulite* (gneissic structure). Ten miles east of Camp 33. August 3, 1891.
42. *Syenite* (semi-porphyritic structure). Main mass of Mount Squires, Barrow Range. August 5, 1891.
42A. *Quartz*, lode in syenite of Mount Squires. August 5, 1891.
43. *Diabase.* Mount Squires, Barrow Range. August 5, 1891.
44. *Ferruginous sandstone.* South-west side of Mount Squires. August 5, 1891.
45. *Specimens* from the *Warburton* Range and *Elder* Creek, D. Lindsay. August 10, 1891.
46. *Specimens* from a *flying trip* in Gibson's Desert, F. W. Leech. August 10, 1891.
47. *Felstone*, from a dyke in Mount Squires. August 26, 1891.
48A. *Syenite*, from Mount Squires. August 29, 1891.
48B. *Porphyry-syenite*, from Mount Squires. August 29, 1891.
48C. *Epidosite*, as lode intersecting 48B. August 29, 1891. Mount Squires.
49. *Felstone-porphyry.* As dykes in Mount Squires. September 1, 1891.
49A. *Quartzose diabase.* South side of Mount Squires. September 1, 1891.
50. *Quartzite.* From Townsend Ridges. September 2, 1891.
50A. *Quartzose grit.* From Townsend Ridges. September 2, 1891.
50B. *Argillaceous sandstone*, with mica lamells. Terraces near Camp 40 (waterhole). September 4, 1891.
50C. *Ferruginous sandstone.* Same locality as No. 50B. September 4, 1891.
50D. *Travertine.* Covering the ferruginous clay sandstone. Same locality. Camp 40. September 4, 1891.
51. *Quartz-pebbles.* As layers in terraces crossed between Camps 40 and 41. September 5, 1891.
51A. *Quartzite.* Ridges between Camps 40 and 41. September 5, 1891.
51B. *Clay* (indurated). Top stratum of ridge between Camps 40 and 41. September 5, 1891.
51C. *Sandstone*, with siliceous cement. Between Camps 40 and 41. D. Lindsay. September 5, 1891.
51D. *Clay*, enclosing minute mica lamells. Ridge between Camp 40 and 41. September 5, 1891.

52. *Argillaceous cement*, of a quartz-breccia. Between Camps 43 and 44. September 9, 1891.
53. *Sand concretions.* Desert between Camps 40 and 50.
53A. *Jasperite* and *quartz.* Between Camps 47 and 48. September 10, 1891.
53B. *Micaceous sandstone.* Outcropping between Camps 47 and 48. September 10, 1891.
54. *Calcareous tuffa.* .From an extinct mound-spring, between Camps 52 and 53. September 11, 1891.
54A. *Carbonaceous travertine.* Between Camps 52 and 53. September 11, 1891.
54B. *Nodular limestone.* Between Camps 52 and 53. September 11, 1891.
55. *Quartz-pebbles.* Between Camps 53 and 54. September 12, 1891.
55A. *Porcellanised sandstone.* Cliffs between Camps 53 and 54. September 12, 1891.
55B. *Obisdian bombs.* Found in Great Victoria Desert. September 1, 1891 ; October 2, 1891.
56A. *Gneiss*, with garnets. Between Camps 53 and 54. September 15, 1891.
56B. *Mica-schist.* Between Camps 53 and 54. September 15, 1891.
56C. *Pegmatite.* Between Camps 53 and 54. September 15, 1891.
56D. *Breccia.* Formed by rubble of aforesaid rocks. Between Camps 53 and 54. September 15, 1891.
56E. *Felspar*, out of a *pegmatite.* Between Camps 53 and 54. September 15, 1891.
57. *Micro-oolitic travertine.* Between Camps 54 and 55. September 16, 1891.
58. *Clay.* From the bottom of Queen Victoria Spring. September 24, 1891.
59. *Sandstone* and *conglomerate*, with *loess.* Cover forming the hills south-west of Victoria Spring. September 25, 1891.
60I. *Hornblendic granite.* Between Camps 61 and 62. September 28, 1891.
60Ia. *Syenite.* Between Camps 61 and 62. September 27, 1891.
60I. *Quartz veins* in schistose rocks. Between Camps 61 and 62. September 27, 1891.
60Ia. *Talcose schist.* Between Camps 61 and 62. September 27, 1891.
60A. *Felspathic rock*, highly decomposed (No. 60B.). Between Camps 61 and 62. September 27, 1891.
60B. *Granitite* (felspathic rock, binary granite). Between Camps 61 and 62. September 27, 1891.

61. *Siliceous slate* (lydite). Between Camps 63 and 64. September 29, 1891.
61A. *Grit rock.* Between Camps 63 and 64. September 28, 1891.
61B. *Siliceous sand-conglomerate* (first state of weathering of 61A). Between Camps 64 and 65. September 30, 1891.
61C. *Siliceous conglomerate* (second state of decomposition of 61A). Between Camps 64 and 65. September 30, 1891.
62. *Gravel and gravel-conglomerate.* Great Victoria Desert. September 2, 1891 ; September 25, 1891.
63. *Limestone nodules.* Between Victoria Spring and Fraser Range. September 25, 1891 ; October 1, 1891.
64. *Magnesite.* Found amongst the lime-nodules. September 28, 1891.
65. *Semi-vitrified sand.* Deposited by white ants in hollow trees. September 30, 1891.
66. Vacat.
67. *Garnetiferous gneiss.* Symonds Hill, Fraser Range. October 15, 1891.
67I. *Hornblendic schist.* Main mass of Fraser Range. October 15, 1891.
68. *Garnetiferous Mica-schist.* North of Fraser Range. October 15, 1891.
68I. *Quartz in veins.* West side of Fraser Range. October 16, 1891
68$_2$. *Quartz* from a *Pegmatite* gangue. Western parts of Fraser Range. October 16, 1891.
69. *Limonite.* North parts of Fraser Range. October 16, 1891. Cap of lode.
69I. *Specularite.* Cap of lode. North of Fraser Range.
69$_2$. *Psilomelane.* Cap of lode. North of Fraser Range. October 16, 1891.
70A. *Felspar* in *pegmatite,* Kangaroo Hill. Fraser Range. October 16, 1891.
70B. *Mica* in *pegmatite,* Kangaroo Hill. Fraser Range. October 10, 1891.
71. *Argillaceous slate.* Between Camps 70 and 71. November 3, 1891.
72. *Hornblendic slate.* Between Camps 70 and 71. November 3, 1891
72A. *Quartz* as lode in schistose rocks. Between Camps 70 and 71. November 3, 1891.
73. *Gneiss.* Between Camps 70 and 71. November 3, 1891.
74. *Indurated hornblendic slate.* Between Camps 70 and 71. November 4, 1891.
75. *Talcose gneiss* (sericit gneiss ?). Near waterhole between Camps 71 and 72. November 11, 1891.

75. *Decomposed gneissic rock.* Same locality. November 4, 1891.
75A. *Siliceous conglomerate.* Cliffs near salt lake, between Camps 72 and 73. November 5, 1891.
75B. *Ferruginous quartz-conglomerate.* Low cliffs along a salt lake, between Camps 72 and 73. November 5, 1891.
75C. *Diabase.* Dykes outcropping in a salt lake between Camps 72 and 73. November 5, 1891.
76. *Diabase.* Specimen of æolian erosion. Chain of salt lakes between Camps 72 and 73. November 5, 1891.
76A. *Siliceous breccia.* Found on shore of small salt lakes between Camps 72 and 73. November 5, 1891.
76B. *Argillaceous sandstone.* Forming a cliff between Camps 73 and 74. November 6, 1891.
77. *Clay* from the bottom of Lake Lefroy; south shore. November 7, 1891.
77A. *Siliceous limonite.* South shore of Lake Lefroy. November 7, 1891.
78. *Efflorescent salts.* Lake Lefroy. November 7, 1891.
79. *Diabase.* South shore of Lake Lefroy, Parker Hills. November 7, 1891.
79A. *Diabase-porphyry.* Parker Hills. November 7, 1891.
79B. *Hornblendic gneiss.* Parker Hills. November 7, 1891.
80. *Indurated hornblendic slate.* Mount Monger and Hunt's Well. November 8, 1891.
81. *Hornblendic schist.* Ranges between Camps 75 and 76. November 8, 1891.
82. *Granite.* Outcropping in big boulders between Camps 76 and 84 November 11-19, 1891.
83. *Gravel*, consisting of a quartzose conglomerate and claystones. Between Camps 80 and 82. November 15-16, 1891.
84. *Quartzose grit*, forming the material for the gravel. Near Mount Caroline. November 17, 1891.
84A. *Quartz* in veins and layers between the grit. Near Mount Caroline. November 17, 1891.
85. *Siliceous schist.* Between Camps 84 and 85. November 11, 1891.
86. *Hornblendic slate* country rock of auriferous lodes at Southern Cross, Yilgarn. November 20, 1891.
86A. *Semi-opal* from Fraser's South Mine. Presented by Captain Oats.
86B. *Tungsten ore.* Found in Fraser's South Mine. Captain Oats.
86C. *Auriferous quartz* from the Central Mine. Presented by Captain Nicholls.
86D. *Auriferous quartz*, from the Central Extended Mine. Presented by Captain Rodgers.

86E. *Wulfenite*, from the Central Extended Mine. Presented by Captain Rodgers.
86F. *Auriferous quartz*, from Hope's Hill Mine, Yilgarn.
86G. *Steatite*, from Hope's Hill Mine (Mr. Dreyer), Yilgarn.
86H. *Molybdenite*, from Hope's Hill Mine, Yilgarn.
86I. *Kaolin* (auriferous), Hope's Hill Mine, Yilgarn.
87. *Hornblendic schist.* Golden Valley, Yilgarn. December 2, 1891.
87A. *Hornblendic slate.* Golden Valley. December 2, 1891.
87B. *Jasper* (highly ferruginous quartz). Dykes and leaders at Golden Valley. December 2 1891.
87C. *Auriferous quartz*, from Katherine Mine, Golden Valley. December 2, 1891. Presented by the Captain.
87D. *Auriferous quartz*, from the Waterhole Mine, Golden Valley. December 2, 1891. Presented by the Captain.
87E. *Quartz with pyrites*, from the lowest level (150) of Katherine Mine. December 2, 1891.
87F. *Hornblende.* Presented by Mr. Huggins, of Golden Valley.
87G. *Travertine.* Ground in creek-bed of Golden Valley. December 2, 1891.
87H. *Argillaceous limestone* (travertine) in cracks and crevices of Catherine Mine, Golden Valley. December 2, 1891.
88. *Bat guano.* In caves of a granite rock near Camp 89, Lake Deborah. November 5, 1891.
89. *Auriferous quartz* from Ullaring. Presented by Mr. Speckmann, of Golden Valley.
90. *Quartzite.* Rocks near Camp 94. December 11, 1891.
91. *Siliceous clay*, resulting from weathered granite rocks near Camp 94. December 11, 1891.
92. *Siliceous sinter.* Covering granite rocks near Camp 94. December 11, 1891.
93. *Argillaceous sandstone.* North of Mount Churchman, Camp 98. December 15, 1891.
94. *Sandstone.* Near Camp 99. December 16, 1891.
95. *Decomposed gneissic rock.* Between Camp 94. December 16, 1891.
96. *Augite-schist.* Near Camp 101 (Mount Kenneth). December 20, 1891.
97. *Schaalstein (porphyry tuffa).* Ten miles west of Mount Kenneth. February 21, 1891.
98. *Diabase* (decomposed). Between Camps 103 and 104, Canning Hills. December 12, 1891.
98A. *Ferruginous quartzite-slate.* Canning Hills. December 22, 1891.
99A-C. *Hornblendic slates* (different states of decomposition). Canning Hills. December 22, 1891.

100. *Decomposed metamorphic schist.* Canning Hills. December 22, 1891.
101. *Decomposed metamorphic rock.* Canning Hills. December 22, 1891.
102. *Indurated slate.* Ten miles N.W. of Townsend Station, Murchison Goldfield. January 2, 1892.
103. *Hornblendic slate.* Camp 111. January 2, 1892.
104. *Opaline sinter.* Twenty-two Miles Well, near Cruikshank's Station. January 3, 1892.
105. *Sand conglomerate.* Near Cruikshank's Station, Annean; Camp 113. January 3, 1892.
106. *Asbestos*, from Mt. Magnet. Presented by Mr. T. C. Simpson. December 1, 1892.
107A. *Gold quartz*, from the Nannine Mine, Murchison goldfield. Presented by Mr. McPherson, discoverer of the field. January 13, 1892.
107B. *Jasperite* (ferruginous quartzite). Murchison Goldfield.
107C. *Decomposed slaty rock.* Murchison Goldfield.
107D. *Hornblendic slate.* Murchison Goldfield.
107E. *Talcose slate.* Murchison Goldfield.
107F. *Micaceous schist.* Murchison Goldfield.
107G. *Amphibole schist.* Murchison Goldfield.
107H. *Mica slate.* Murchison Goldfield.

N.B.—A complete collection of the above was presented to the School of Mines, Adelaide, and a nearly complete collection to each of the following institutions:—Geological Museum, Perth; Royal College of Science, London; and Mining Academy, Freiberg.

SUPPLEMENTARY NOTES ON THE ABOVE-NAMED COLLECTION.*

By A. W. Stelzner, Professor of Geology and Palæontology, of the Royal Saxon Academy of Mines at Freiberg.

Mr. Victor Streich, Adelaide.

Dear Sir—According to your desire, I submit to you my opinion on the rock specimens collected by you, especially on those which require, according to my opinion, a different determination as given by you on the labels.

"1B. *Epidote Diabase.* Everard Range, occurring in dykes." It is probably one of those mixtures consisting of quartz and

* Received since the above list was printed.—[Ed. 13/3/93.]

epidote which occurs frequently in crevices of granites and syenites, and which are to be taken as a product of lateral segregation of these rocks.

"1G. *Diorite*, in huge masses west of main mass of Everard Range." According to the microscopical examination of the prepared rock-section, quartzose diabase of ophitic structure; quartz is only present in small quantities. As an accessory constituent is to be mentioned apatite. The same applies to 1H.

"8. *Metamorphic hornblendic rock.* Ten miles west of Camp No. 2." Is gneiss.

"10B. *Diorite.* Protruding low granite hills two miles north-west of Camp No. 4." Is quartzose diabase. Plagioclase and quartz show partly granophysic structure. Some biotite is also present.

"11A. *Diorite.* Low hills between Camps 4 and 5." Is olivine diabase.

"17. *Diorite.* Low hills near Camp 9." Is very compact olivine diabase.

"22. *Felspathose rock.* Low range, Camp 14." Is a very fine granular granite.

"26. *Diorite.* Small veins in granite of Mount Sir Thomas." Is diabase poor in olivine.

"33A. *Porphyrite.* Dykes in porphyritic syenite, Skirmish Hill." There are in the principal matrix of this rock porphyritic orthoclase crystals. As the petography of to-day applies the word porphyry only to porphyritic rocks containing plagioclase, the term felsite-porphyry would be more appropriate.

"39. *Diorite* (Bell rock). Cavenagh Range." Is according to the result of microscopical examination of the prepared rock section a very compact olivine diabase.

"40. *Tachylite.* Mount Cooper, Cavenagh Range." This rock is of such an extremely fine grain, that I can not determine it, even with the aid of the microscope on rock sections.

"41A. *Granulite.* Ten miles East of Camp 33, Barrow Range." This rock resembles so closely the granulite of the Saxon granulite-ellipsis, that it could have been found there as well!*

"47. *Felstone.* Mount Squires." Felsite-porphyry (*vide* N. 33A).

"48. *Epidosite.* Intruding as veins, the syenite of Mount Squires." These veins are results of lateral-segregation (like 1B), and can not be looked upon as special rock formations. The same is to be said about N. 49 and N. 49A. (quartzose diabase). In the syenite of the Plauenshe Grund near Dresden these small segregation-veins are of constant occurrence.

*Herman Credner, Erlaeuterungen der geol. Special—Karte von Sachsen, Sectionen Geringswalde, Glauchau, Rochlitz, Waldheim.

"49. *Feldstone-porphyry.* Dykes in Mount Squires." According to the prepared rock section a true felsite-porphyry.

"53B. *Micaceous sandstone.* Outcropping between Camp 47-48." According to its lithological character, I should call it micaceous schist.

"55B. *Obsidian-bombs.* Found between Everard Range and Fraser Range." Most decidedly not of cosmic origin, as suggested by you in your private letter to me. At least, so far there are no vitreous masses known to me of meteoric origin. According to their shape, I feel inclined to pronounce them as waterworn, and I should think that the obsidian, from which they are derived, will be found yet *in situ*. I cannot say anything more about them without any knowledge of their occurrence.

"56A. *Gneiss with garnets.* Between Camps 53 and 54." The specimen submitted to me is free from felspar, and, therefore, micaceous schist.

"67I. *Hornblende-schist.* Main mass of Fraser Range." Is, according to the microscopical examination of the rock section, an undecomposed diabase, which is distinguished on account of its containing highly pleochroitic augite and biotite and apatite as accessory components.

"72. *Hornblendic slate.* Between Camps 70 and 71." In consideration of the microscopical examination of a section of this rock, to be pronounced as amphibolite.

"75C. *Diabase.* Dykes in salt lake between Camps 72 and 73." Like 72, and therefore not an intrusive rock.

"80. *Indurated hornblendic slate.* Mount Monger and Hunt's Well." Is indurated argillaceous slate.

"87F. *Hornblende.* Golden Valley." Is fibrous tourmaline, as ascertained by the microscope and the blowpipe (containing boracic acid).

"96. *Augite-schist.* Near Camp 101, Mt. Kenneth." According to the microscopical examination, rather diorite, which contains, probably as a secondary formation, small quantities of quartz and epidote.

"107B. *Micaceous schist.* Murchison Goldfield." Contains felspar, and therefore to be called gneiss.

Without any knowledge of the formation and occurrence of the rock specimens submitted to me, I am not able to give any geological notes on them. I have, therefore, limited myself to these few petrographical notes, and I hope and wish that they will be of some use to you.

Yours obediently,

A. W. STELZNER.

APPENDIX.

LIST OF ROCK SPECIMENS

Collected by Mr. Wells on a journey East from Murchison Goldfield, determined by Professor Tate.

Sandstones.

30. Fine sandstone. March 19, 1892.
31A. Coarser siliceous sandstone. March 22, 1892; lat. 26° 47′, long. 123° 13′.
32. Coarser siliceous sandstone. March, 24, 1892.
33B. Sandstone (laminated). March 24, 1892.

Quartzites.

2A. Schistose quartzite, banded with hæmatite. February 26, 1892.
2B. Schistose quartzite, banded with hæmatite. February 26, 1892.
19. Quartzite. March 8, 1892.
42. Quartzite. April 2, 1892.
26. Banded quartzite. March 12, 1892.
40A. Banded quartzite. March 31, 1892.
34. Quartzite, with cavities containing ilmenite. March 27, 1892; lat. 26° 26′, long. 121° 50′.

Clays.

20. Decomposed clay-slate. March 8, 1892.
22. Impure kaolin. March 8, 1892.
30. White siliceous mudstone. March 19, 1892.
33c. White hard slate. March 24, 1892.
38. Decomposed clay-slate. March 30, 1892; lat. 26° 30′, long. 120° 52′.

Ironstones, &c.

17. Ironstone. March 7, 1892.
23. Ironstone, limonite. March 9, 1892.
31. Siliceous ferro-mudstone. March 22, 1892.
36. Ironstone gossan. March 28, 1892.
6D. Agglomerated hollow spheroids of siliceous limonite (concretionary). March 1, 1892.

Flints.

21B. Chert. March 8, 1892.
40B. Chert. March 31, 1892.

Vein Quartz.

3A. Vein quartz. February 27, 1892; lat. 27° 20′, long. 120° 10′.
4. Vein quartz. February 29, 1892.
6A. Vein quartz. March 1, 1892.
6B. Vein quartz. March 1, 1892.
6C. Breccia of vein quartz with limonite-cement. March 1, 1892.
10A. Vein quartz. March 5, 1892.
11A. Vein quartz. March 5, 1892.
11B. Breccia of vein quartz with limonite-cement. March 5, 1892.
14. Vein quartz. March 6, 1892.
27A. Auriferous quartz. March 12, 1892.
11C. Vein quartz. March 5, 1892.
27. Vein quartz. March 12, 1892.

Grits, &c.

1. Sharp quartzitic grit (probably derived from waste of granite). February 25, 1892.
3B. Coarse grit. Same nature as 1. February 27, 1892.
9. Foliated felspatho-quartzose grit. March 4, 1892.
10B. Ferruginous quartzose grit. March 5, 1892.
12. Conglomerate of small quartz-pebbles. March 5, 1892.
16. Decomposed quartzose felstone. March 7, 1892; lat. 27° 34′, long. 121° 47′.
18. Conglomerate of small quartz-pebbles, with smaller grains. March 7, 1892.
21A. Quartzitic grit. March 8, 1892.
24. Sharp quartzitic grit (probably derived from waste of granite). March 10, 1892.
33A. Sharp quartzitic grit (probably derived from waste of granite). March 24, 1892.
39. Conglomerate of small quartz-pebbles. March 31, 1892.

Granulites, &c.

25A. Granulite. March 11, 1892.
25B. Granulite. March 11, 1892.
28. Granulite, passing to granite. March 13, 1892.
29. Granulite. March 13, 1892.
35. Decomposed macro-granulite. March 27, 1892; lat. 26° 26′, long. 121° 50′.
37. Decomposed granulite. March 30, 1892.
41. Decomposed macro-granulite. March 31, 1892.

Diorites.

5. Gabbro. March 1, 1892.
13. Diorite. March 6, 1892.

Miscellaneous.

6E. Hornblende-schist. March 1, 1892.
27B. Micaceous schist, decomposed. March 12, 1892.
7. Wood asbestos. March 1, 1892.
15. Travertine. March 6, 1892.

N.B.—A complete collection of the above was presented to the School of Mines, Adelaide.

METEOROLOGY.

By VICTOR STREICH,

Geologist to the Expedition.

Notes re Meteorological Record.—A description and enumeration of the meteorological instruments employed being unnecessary, it remains here only to say a few words about the method of observing, and also a few remarks as to the occasional observations of meteorologically interesting phenomena. The hours of observation were 9 a.m., 3 p.m., and 9 p.m. The last-mentioned hour, however, could not be kept during the earlier stages of the journey, owing to the early hour at which the camp retired for the night. The instruments themselves were read according to the instructions given by Mr. Todd, C.M.G., in the handbook for the officers. Concerning the completeness of the register, every effort was made to keep it regularly posted; but from unavoidable causes, such as difficulties in travelling usually met with, or geological researches of an engrossing nature receiving particular attention at the hour for observation, several blanks in the register were necessitated. The entries in the register state the simple reading-off of the instruments, no corrections or reductions of any kind have been made on them. The observations have been all made by myself, except from the 10th to the 15th January, 1892, at the Annean Station, Murchison, where, during my absence on a flying trip to the neighbouring goldfields, Mr. Helms had the goodness to keep the meteorological register, I having satisfied myself from previous trials that our methods of observing were alike. As it will be noticed, more elaborate observations were made when in stationary camps (October, 1891, Fraser Range), and also that a kind of "term observations" were made on the 21st of each month, at least whenever possible. It will be found stated in the register (under the heading "Remarks") when observations were made in camp or *en route*. The barometrical readings when *en route*, of course, cannot claim to be of great importance as *meteorological* observations, as the height when read-off at the aforesaid hours differed sometimes considerably. Unfortunately a great number of thermometers had to be sacrificed for the sake of science, as all thermometrical observations were read off after swinging, and to swing a thermometer on camel back without accident in a dense Australian bush is by no means an easy matter. Fortunately, however, the supply was sufficient to prevent the loss of any records in the register.

Occasional Observations.--Short entries have been made in the register ; but it will be serviceable to give here a more exhaustive description of them.

Zodiacal Lights.—These were developed with a remarkable degree of distinctness, especially from August to December, and were visible about half an hour after sunset. Under favourable circumstances, not only was the well-known glowing pyramid to be seen in the west ,but also a smaller and less distinct one rising over the eastern horizon. The connecting bridge, however, between these two, which is said to be visible in dry, tropical, as also sub-tropical regions, could not be discerned, neither was a zodiacal light ever to be seen before day-dawn.

Meteors.—These phenomena were frequently observed all through. At the end of the month of July, and at the beginning of August, however, they were more numerous than at any other time. The radiative point of the "Swarm" was situated in the northern portion of the sky. Another less prominent flock of meteors was observed on the 21st December, its radiative point lying apparently in the southern part of the firmament.

Irridescent Clouds.—A splendid phenomenon was observed on the 29th December, 1891. A stratus cloud partly cirrial covering the sun, shone in splendid rainbow colours, green and violet being the most conspicuous. It lasted for about two minutes, and the cloud being the only one disappeared suddenly at the expiration of about that time. It occurred at 1.20 p.m., temperature being at the time about 104°, wind slight, in a south-westerly direction.

Surface Temperature.—Careful observations were also taken to ascertain the nocturnal decrease in temperature of the surface of the earth, and the temperature of the air. This was done in the undermentioned way, and read-off in the morning before sunrise. For that purpose three thermometers were used, one being fixed about six inches above the ground, the next two feet and a half, and the third five feet, and the following results were obtained :—

(1) *Birksgate Range.*—Camp surrounded by high granite ranges, and well protected from winds. Immediately above the ground, $37\frac{1}{2}°$; $2\frac{1}{2}$ ft. above ground, 39° ; 5 ft. above ground, 40° F.

(2) At *Skirmish Hill.*—Camp in a fairly open plain, on the east side of the hill, about half a mile away. Six inches above ground, 23° ; 2 ft. above ground, 24·5° ; 5 ft. above ground, 26° F.

(3) At *Barrow Range.*—Camp in an open plain, only a few granite rocks some 100 yards off. Six inches above ground, 25° ; $2\frac{1}{2}$ ft. above ground, 28° ; 5 ft. above ground, 30° F.

The great difference of the three readings of the last observa-

tion is probably due to the unprotectedness of the camp, whilst the two other observations show the influence which is exercised by neighbouring hills. In all three cases the observations show differences which are quite astonishing. The minimum temperature for every night, as given in the observations, was taken 5 ft. above ground.

Cloudage. —The *kind* of clouds is not given in the meteorological tables, as there is no space provided for such particulars, although same were duly registered in the Field Book, as well as the direction from which they were moving.

It may be mentioned here that it was observed that the *cirrus*, the genuine feathery kind, was generally found in the early morning and in the evening shortly before and after sunset, and that this upper current cloudage almost invariably moved from north-west.

The *cirro-cumulus* was rarely observed, and never so moving, from a distinct direction, but whenever seen it could be taken as a sure indication of an increase of atmospherical moisture.

Cumulus clouds generally aggregated towards noon. The direction in which they moved was in the early portion of our journey (May-July) very variable, but during the latter part an easterly direction was prevalent.

From these general remarks however about cloudage, and its main direction of moving, the portion about, and south of, Queen Victoria Spring, and down to the Fraser Range, must be excepted, for this region being situated within the reach of coastal influences, the climate and conditions were consequently more of a maritime nature.

Some of the reasons for assuming that a distinct climatic boundary exists here have been given in a former chapter, and are purely of topographical nature.

It may be added here that a few days before reaching Queen Victoria Spring a strong cooling south-south-west breeze could be noticed springing up about 11 a.m. every day, which increased in strength as the coast was approached.

Should not also the existence of such a strong soakage, as Queen Victoria Spring has been at one time, be attributed to the meeting in this region of the dry and hot north-east winds of the interior with the moist southerly coastal winds, which, if it should take place, would be bound to create at times heavy atmospherical disturbances; and, furthermore, does not the occurrence of Xanthorrhea thereabout also point to increased atmospherical precipitates?

On Electric Discharges.—None were observed during the early part of the journey. It was at the end of September, between Victoria Spring and Fraser Range, when slight light-

ning, without thunder, was noticeable towards east. A few similarly slight discharges witnout atmospherical precipitates were observed during the next three months, but it was not until the beginning of January that the proper thunderstorm season set in, notwithstanding the intense dry heat which was experienced at this time.

Here a few words about the phenomenon of booming noises, about which a few remarks are given in the "Handbook for the Guidance of the Officers of the Expedition," viz. :—

"Travellers and explorers in different parts of the world have occasionally been startled by loud booming sounds resembling the distant discharge of heavy pieces of artillery. Captain Sturt, in his explorations on the Darling in 1828, and again in 1844 in the Far North, between the Stony Desert and Eyre's Creek, reports having heard similar noises, but was unable to offer any suggestions as to their cause. In the event of such sounds being heard by yourself or by other members of the party, you will be careful to note the exact time on which heard, the supposed distance away and the direction, the state of the atmosphere (whether clear or cloudy), the nature of the surrounding country (whether sandy and flat or rocky and mountainous), and, by way of comparison, refer to similar well-known sounds. Enquiries on these points should also be made at all stations throughout Central Australia, and at all outlying sheep and cattle stations at which the expedition may happen to call, carefully noting every instance of these loud noises being heard, together with the name of your informant, his opinion as to the cause, and such other matter as would be recorded under the above instructions if heard by yourself. It is of the utmost importance to note whether such sounds are accompanied by any sensible vibrations of air or earth, and whether accompanied by any rumbling like thunder."

Though not fortunate enough to perceive it myself, by making enquiries I found that they were heard at the Fraser Range Station, at Yilgarn, and frequently during the last eight years at the Ameau Station. No definite information was, however, obtained, as to the time, state of weather when they occurred, or such other details. Taking into consideration that these sounds were heard at three places which are geologically and topographically so vastly different, viz., *Fraser Range*, high and steep mountains of metamorphic rocks, *Yilgarn* slightly undulating country, salt lakes and plains of moderate extent, and *Ameau Station*, wide, boundless, alluvial flats, and furthermore the same phenomenon has been heard in the Lake Eyre country and the Upper Murray, both regions of an entirely different geological character, certainly different to those places in Western

Australia, I feel convinced that this noise is not caused by any force of geological or terrestrial origin. But as these places from which the phenomenon in question is reported belong to the most arid regions of Australia, in which nothing but the meteorological conditions are alike, it must be assumed that these subaerial conditions are the cause. I should think that they are detonations resulting from electrical discharges in the form of a glow discharge, which while spreading over a large area is less perceptible, and is said to occur more frequently in a dry continental climate during a dry thunderstorm.

NOTES ON THE METEOROLOGICAL OBSERVATIONS TAKEN BY MR. VICTOR STREICH.

By C. Todd, Esq., M.A., F.R.S.

May, 1891.

The expedition travelled this month from Warrina Station on the Great Northern or Transcontinental Railway, lat. 28° 12′ S., long. 135° 48′ E. to Everard Range.

The observations were commenced on the 3rd, but, owing no doubt to the difficulties incidental to rough bush travelling, they are somewhat incomplete, and for the most part were taken *en route*, and not at camps. The aneroid was read at 9h. a.m. and 3h. p.m., at elevations varying from, approximately, 323 feet to 1800 feet above sea level. The dry and wet bulb thermometers were read regulary at 9h. a.m. and 3h. p.m., but not at 9h. p.m. Only a few readings of the minimum thermometer were taken, and but one of the maximum. These omissions render the observations of less value than those of subsequent months; but it is due to Mr. Streich to say that, taking his circumstances into consideration, he deserves great credit for the manner in which he carried out the work entrusted to him. It is not an easy task to take observations on a camel's back travelling over a rough country.

Referring to the observations in May, the temperature at 9h. a.m. ranged generally between 55° and 70°, only once rising above 70°, viz., 74° on the 6th, the maximum on that, the only day on which it was recorded being 86°, the hottest day experienced during the month, the thermometer standing at 80° at 3 p.m.; on only two days did it reach 80° at 3 p.m., viz., 80° on the 5th, and 81° on the 26th. The weather was therefore fairly cool and pleasant, with south-east, east, and north-east winds

only twice veering to north-west, and on two days to south-west. The air was mostly dry, but there was a thunderstorm on the 7th, 8th, followed by steady rain, about 0·250 inches falling before 3 p.m. of the 8th, and about 1·750 inches, continuous rain lasting from 4 p.m. of the 8th till 9h. a.m. of the 9th, with a high barometer (aneroid 30·20 at 9h. a.m., falling rapidly to 29·85 at 3 p.m. Rain also fell on the 27th, 28th, and 29th, setting in on the last date at 3 p.m., and raining heavily with storms during the night (1,600 feet above sea level; aneroid 28·50 at 9h. a.m. of the 30th, and 28·20 at 3 p.m.) A white frost on the morning of the 11th, the temperature falling to 32°.

Aneroid.

Mean at 9h. a.m.	...	29·45
" 3h. p.m.	...	29·32

Temperature.

		Dry Bulb.	Wet Bulb.
Mean at 9h. a.m.	...	61·0	55·0
" 3h. p.m.	...	73·0	58·0

JUNE.

During this month the observations were taken regularly, there being but few gaps. The aneroid and the thermometers were read at 9 a.m and 3 p.m., and the minimum and maximum temperatures were also taken. The expedition travelled from near Mount Illbillie (lat. 27° 3′, long. 132′ 30′) to Camp 11 (lat. 27° 28′, long. 130° 38′), at elevations varying from 1,950 feet on the 1st to 1,700 feet on the 30th. The observations were taken in camp, near Mount Illbillie, on the 2nd, 3rd, 4th, 5th, and 6th, at 1,950 feet, and the height of the summit was hypsometrically determined to be 3,010 feet. During these five days the aneroid at the camp at base of hill ranged from 28·10 inches at 9h. a.m. of the 2nd to 28·40 at 3 p.m. on the 6th, the minimum and maximum temperatures being as under: —

	Min.	Max.
June 2	35°	67°
" 3	37	69
" 4	37	54
" 5	38	56
" 6	33	55

On the 3rd, at noon, the aneroid at the base of Illbillie was 28·10; the temperature, dry bulb 68°, wet bulb 50°; relative humidity, $\frac{31}{100}$. At 3h. p.m., at the top of the mount, the aneroid read 27·12; dry bulb (thermometer) 61°, wet bulb 51°; relative humidity, $\frac{50}{100}$.

Rain set in after 2 p.m. on the 1st, and showers continued

during the three following days, with the wind on the 1st and 2nd north-west, veering afterwards to south-east. A little rain fell also on the 12th, and there was a Scotch mist on the 13th.

The observations were also taken in Camp 4 (lat 27° 10′, long. 131° 48′) from the morning of the 10th till 9h. a.m. of the 18th. Elevation of the hypsometer 1,850 feet. The aneroid during this period ranged from 28·03 inches at 3h. p.m. of the 10th to 28·49 at 9h. a.m. on the 14th, and the minimum and maximum temperatures were as under :

	Min.	Max.	
10th	32	69	Clear.
11th	35	66	Cloudy.
12th	30	69	Cloudy, little rain.
13th	29	60	Cloudy.
14th	29	66	Clear.
15th	26·5	63	Clear.
16th	29	69	Clear.
17th	28	67	Clear.
18th	40	70	Cloudy.

The only other rests were at Camp 6 (1,575 ft.), on 20th and 21st ; Camp 9 (1,540 ft.), from evening of 23rd to 9h. a.m. of the 27th ; and at Camp 10, on 28th and 29th.

With the exception of the first four days, and the 11th and 12th, the weather was fine ; the winds variable, south-east being the most frequent, and on some days, especially during the last five days, west (N.W. to S.W.).

The nights throughout were very cold, the temperature falling below freezing on 16 nights, the lowest being 22°, on the morning of the 23rd, with clear sky and light north-east wind, the mean, often minimum, reading was 30·5° or 1·5° below freezing. The highest minimum was 40° on the 18th. The days were pleasantly warm, the highest temperature (73°) curiously enough occurred on the same day as the lowest (22°), viz., on the 23rd, or a range of 51° during the day.

The sky was clear, or mostly clear, on 13 days, and partially clouded on 11 days. Faint zodiacal light on evening of 25th.

Aneroid.

Mean at 9h. a.m.	...	28·32
" 3h. p.m.	...	28·23

Temperature.

		Dry Bulb.	Wet Bulb.
Mean minimum	...	30·5°	
" at 9h. a.m.	...	52·6	46·7
" maximum	...	64·2	
" at 3h. p.m.	...	61·3	49·1

Highest during month...	73	on 23rd
Lowest " " ...	22	on 23rd

Cloud (0—100).

Mean amount at 9h. a.m. ...	3·9	per cent.
" " at 3h. p.m. ...	4·2	"

JULY.

During this month the expedition was constantly on the move, from Camps 12 to 31 the country traversed lying between lat. 27° 33′, long. 130° 34′, and lat. 26° 10′, long. 127° 57′, at elevations above sea level ranging from 1,500 to 1,850 feet. The only long stoppages were four days (21st, 22nd, 23rd, and 24th) at Camp 27, 1,355 feet by hypsometer above sea level; and Camp 31, or Fort Müller, 1,517 feet by hypsometer, from July 28 to August 2 six days.

The chief features of the month were very cold nights, moderately warm days, and clear sky. The lowest temperature was 19°, on the morning of the 20th, at Camp 26 (lat. 27° 20′ 14″, long. 130° 4′), with a dry north-east wind, but the thermometer fell below freezing on 17 nights out of 29 on which observations were taken, and the minimum recorded 35° on only four nights. On the morning of the 1st, at Camp 12, 1,580 feet, it was 20°, and the mean of the lowest readings was only 30° 2′. As showing the rapid rise in temperature after sunrise in the interior, it may be mentioned that the mean at 9h. a.m. was 52° 9′, whilst the mean maximum was 68° 4′, or a mean daily range of 38° 2′. Owing to difficulties incidental to bush travelling, and where the observations have to be taken *en route*, the maximum readings were missed on five days; out of the remaining 26 days the temperature reached or receded 70° on 15 days, the highest being 77° on the 19th, the minimum on the morning of the same day being 24°, showing a range of 53° in less than 12 hours. The air was also very dry, as shown by the readings of the wet bulb thermometer. The sky was clear, or nearly so, on 23 or 24 days. The weather was fine throughout, except on the night of the 9th-10th, when a few showers fell. The winds were westerly during the first half of the month, and east and south-east afterwards, a strong easterly gale blowing on the nights of the 28th, 29th, and 30th. There was a warm southerly wind on the 31st, with a little rain and hail. A Mallet seismometer was fixed up at Camp 31, but indicated no earth tremors (*vide* Geological Report, *ante* p. 79).

Highest reading of aneroid, 28·72 inches, at 9h. a.m. on 18th, Camp 24. Lowest reading, 27·50 inches, at 3h. p.m. on the 9th, on the top of Mount Watson, 2,226 feet by hypsometer. Mean

reading of aneroid, 9h. a.m., 28·38 inches. Mean reading of aneroid, 3h. p.m., 28·29 inches.

Temperature.

Mean minimum	...	...	30·2
" at 9h. a.m.	...	...	52·9
" maximum	...	...	68·4
" at 3h. p.m.	...	...	66·7

Wet Bulb.

Mean at 9h. a.m.	...	...	43·5
" at 3h. p.m.	...	...	47·5

August.

There was not much travelling this month, and the observations were all made in the immediate neighbourhood of the Barrow Range (Camps 31 to 37), or between long. 127° 57′ and 127° 15′, and lat. 26° 11′ and 26° 30′; principally (on the 4th, and from the 9th to the 22nd) at Camp 33, long. 127° 33′ E., lat. 26° 3′ S., 1,566 feet above sea level, and Camp 35, at the base of Mount Squires—127° 30′ E., 26° 14′, 1,590 feet. The month was almost cloudless throughout, the prevailing wind being east to south-east, occasionally veering to north and north-west. Heavy north-western gale was recorded on the 13th, veering to south-west. The nights during the first three weeks were very cold, the thermometer sinking below freezing point on 14 nights out of the 21, but warmer during the rest of the month. On two nights the 15th and 19th—the minimum was 20°. The warmest night was on the 30th; minimum, 48°. The days, as usual, were warm, the thermometer being at or above 80° on seven days, and above 70° on 27 days; the highest being 85° on the 22nd and 31st, or a range of 65° in the month; the lowest maximum being 65° on the 18th. The aneroid barometer reached its minimum, 28·10 inches, at 3 p.m. on the 11th, at Camp 33; and its maximum, 28·61 inches, at 9 a.m. on the 20th.

Aneroid.

Mean at 9 a.m.	...	...	28·42 inches
" at 3 p.m.	...	...	28·33 "
" at 9 p.m.	...	...	28·37 "
Mean minimum temperature		...	33·5°
" at 9 a.m. Dry bulb		...	57·7
Wet bulb		...	45·5
" maximum temperature		...	75·7
" at 3 p.m. Dry bulb		...	72·2
Wet bulb		...	51·1

Mean at 9 p.m.	Dry bulb	...	54·3°
	Wet bulb	...	42·1
"	temperature of month	...	54·6
"	diurnal range ...	...	42·2

Cloud (0--100).

Mean amount at 9 a.m.	...	...	1 per cent.
" "	at 3 p.m.	...	...	2 "
" "	at 9 p.m.	...	...	0 "

Heavy north-west gale from noon to sunset on the 13th.

Heavy south-east gale set in at 4h. a.m. on 26th, and sky overcast.

The sky was also overcast for a few hours before sunrise on the 31st, with strong north-east wind.

Zodiacal light, bright, on 5th, between 6.30 and 7.20 p.m.; and on evening of 25th. Shooting stars frequent on evenings of 5th, 6th, and 7th; and two fine meteors on the evening of the 8th.

September.

Country travelled over from Barrow Range to Fraser Range at elevations varying from 1,600 to 700 feet above the sea. The days, with four exceptions, were warm, the temperature being 90° or over on five days, and over 80° on 11 days, absolute maximum 98° on the 27th. The nights were cool, falling to or below freezing on six nights, the lowest being 26°, on the morning of the 20th, when there was a white frost. The weather was exceptionally cool on the 16th, 17th, 18th, and 19th. With a heavy gale from the west and south-west on the first day, the maximum temperatures, 55° on 16th, 58° on 18th, and 61° on 19th, and the air was so humid that the wet bulb thermometer at 3 p.m. read (50°) only one degree lower than the dry bulb. Wind south-east to north-east. Light rain between 5 a.m. and 8 a.m. on 13th, and a few drops on nights of 18th and 19th. Sky mostly clear, but overcast or partially clouded on 11th, 12th, 13th, 16th, and 17th.

Lightning noted on the 12th and 25th, and fog on the 13th. Zodiacal light seen on evenings of 3rd and 23rd. The observations imperfect after 25th through difficulties in travelling.

Pressure.

Mean reading of aneroid at	9h. a.m.	...	28·82
" "	3h. p.m.	...	28·94
" "	9h. p.m.	...	28·81

Temperature.

Mean of minimum	...	...	38·4°
" at 9h. a.m. ...	...	...	61·1

Mean maximum	...	...	78·2°
" at 3h. p.m.	...	...	73·8
" at 9h. p..m.	...	...	55·8
" diurnal range	...	...	39·8
Extreme range in month	...	...	72·0

Wet Bulb.

Mean at 9h. a.m.	...	...	49·7°
" at 3h. p.m.	...	...	53·9
" at 9h. p.m.	...	...	46·0

Cloud (0—100).

Mean amount at 9h. a.m.	...	23 per cent.
" " 3h. p.m.	...	32 "
" " 9h. p.m.	...	9 "

OCTOBER.

No observations were taken during the first four days, owing to difficulties in travelling. From the 5th to the end of the month, with a break on the 20th, 21st, and 22nd, they were taken at Camp 69, Fraser's Range (lat. 31° 51′ S., long. 122° 45′ E.), 1,236 feet above sea level. The nights were now warmer than during the previous months, the temperature falling below 40° on only one night, viz., 37° on the 10th, and the minimum readings ranged at or over 50° on 12 nights out of 26. The days were moderately hot, the maximum readings from 68° on the 9th to 98° on the 19th, or over 90° on three days. The sky was clouded or overcast nearly every day, with light to moderate variable winds, alternating for the most part from south-east to south-west. Thunderstorms were experienced on six days, viz., 6th, 19th, 23rd, 24th, 27th, and 28th, but were accompanied by only a few drops of rain, except on the 28th, when there was a good shower, with hail.

Mean reading of aneroid at	9h. a.m.	...	28·80 inches
" "	12h. noon	...	28·78 "
" "	3h. p.m.	...	28·70 "
" "	6h. p.m.	...	28·76 "
" "	9h. p.m.	...	28·79 "

Temperature.

			Dry Bulb.
Mean minimum	...	...	49·5°
" at 9h. a.m.	...	...	65·1
" at 12h. noon	...	...	76·3
" maximum	...	...	79·7
" at 3h. p.m.	...	...	76·5
" at 6h. p.m.	...	...	68·4
" at 9h. p.m.	...	...	62·2

Cloud (0– 100).

Mean amount	at	9h. a.m.	...	3·9 per cent.
"	"	noon	...	3·5 "
"	"	3h. p.m.	...	4·1 "
"	"	6h. p.m.	...	2·5 "
"	"	9h. p.m.	...	1·9 "

Dew on 8th, 17th, 15th, 29th, and 30th.

NOVEMBER.

The expedition travelled from Fraser Range to the Yilgarn Goldfields, and the observations were taken, *en route*, at heights varying from 1,500 to 900 feet above the sea. No observations could be recorded on the 20th, 21st, and 22nd, owing to the absence of Mr. Streich from the Camp, and also on the 30th.

The nights were moderately cool, and the days hot, the minimum thermometer ranging between 41°, the lowest on the 4th, and 65°, and over 60°, on eight nights. During the day the temperature reached or receded 90 on 17 days out of the 26 on which readings were taken, and was above 100° on four days, the absolute maximum being 105° on the 23rd. The weather was fine and dry, only a few drops of rain falling during two thunderstorms on the 6th and 14th. The wind was light and variable, south-east the most prevalent.

Mean reading of aneroid	at	9h. a.m.	...	28·62 inches.
"	"	3h. p.m.	...	28·50 "
"	"	9h. p.m.	...	28·54 "

Temperature.

Mean minimum	... ...	...	56·1
" "	at 9h. a.m.	...	74·9
" maximum	... ...	...	92·8
" "	at 3h. p.m.	...	90·6
" "	at 9h. p.m.	...	70·1

Cloud (0—100).

Mean amount	at	9h. a.m.	...	20 per cent.
"	"	3h. p.m.	...	32 "
"	"	9h. p.m.	...	18 "

DECEMBER.

Country passed over between Yilgarn and the Murchison District at elevation of from 1,600 to 1,000 feet above the sea. Weather hot throughout, the thermometer ranging from 90° upwards on 25 days, and over 100° on 16 days, the absolute maximum being 109° on the 27th and 28th. The nights too were for the most part warm, falling below 60° on only ten nights; the lowest, 52°, on the 10th; the highest minimum, 75°, on the

27th. The extreme range of temperature was 57°, whilst the average daily range was 36° 1′. Winds variable, frequently south-west and north-west. Weather fine, but on many days clouded. Thunderstorms, with only a few drops of rain, on the 5th and 6th; and lightning also on the 8th, 25th, and 26th. A westerly gale, with rain, on the night of the 10th; and rain, with south-easterly wind, on the 16th.

Fine solar halo on the 29th.

Mean reading of aneroid at 9h. a.m.	28·42	inches
" " at 3h. p.m.	28·33	"
" " at 9h. p.m.	28·37	"

Temperature.

Mean minimum	62·8°
" at 9h. a.m.	8·38
" maximum	98·9
" at 3h. p.m.	96·3
" at 9h. p.m.	78·8
" of wet bulb at 9h. a.m. ...	62·6
" " at 3h. p.m. ...	64·7
" " at 9h. p.m. ...	60·2

Cloud (0—100).

Mean amount at 9h. a.m. ...	15	per cent.
" " at 3h. p.m. ...	23	"
" " at 9h. p.m. ...	15	"

Clear or cloudless on 13 days.

January, 1892.

The observations after the 3rd were all taken at the Annean Station, in the Murchison District, about 1,550 feet above the sea, and extend only to the 21st, after which date they were discontinued. Weather hot throughout, the temperature exceeding 90° on every day but the 11th (88·8°) and over 100° on 18 days, and of the 21 the highest being 114°. The minimum readings range from 65° on the 1st to 82° on the 10th. The extreme range during the three weeks 49°, and the mean daily range 29·8°

Thunderstorms on the 2nd, 3rd, 6th, 10th, 13th, 14th, 15th, and 16th; and lightning seen on several other days, but very little rain fell, only 0·470 inches, as follows:

1st	...	9h. a.m.	...	0·190 inches
2nd	...	9h. a.m.	...	0·110 "
6th	...	9h. p.m.	...	0·110 "
16th	...	9h. p.m.	...	0·060 "

Generally more or less cloudy, especially in the afternoon and night.

Mean reading of aneroid at	9h. a.m. ...	28·18 inches
" "	3h. p.m. ...	28·08 "
" "	9h. p.m. ...	28·12 "

Temperature.

Mean minimum	... 74·3°
" at 9h. a.m.... ...	... 89·6
" maximum	... 104·1
" at 3h. p.m.... ...	... 101·1
" at 9h. p.m.... ...	... 88·1
" temperature ...	... 89·2

Wet Bulb.

Mean at 9h. a.m.... ...	... 66·8
" at 3h. p.m.... ...	... 69·1
" at 9h. p.m.... ..	... 67·6

Cloud (0—100).

Mean amount at	9h. a.m. ...	29 per cent.
" "	at 3h. p.m. ...	51 "
" "	at 9h. p.m. ...	50 "

Meteorological Observations taken by Mr. Victor Streich, Geologist accompanying the Elder Exploring Expedition. 1891—May.

Day of Month.	Camp. Morning. No.	Height.	Eyening. No.	Height.	Aneroid Barometer. 9 a.m.	9 p.m.	Temperature. Dry Bulb. Min.	9 a.	Max.	3 p.	9 p	Wet Bulb. 9 a.	3 p.	9 p.	General Direction of Wind.
1															
2															
3	Nilpena, S.A.		Cootanoorina, S.A.		29·99			58		77		53	54		E.
4	Cootanoorina, S.A.		"		·95		36	64		79		56	60		E.
5	"		"		·94		40	66		80		57	60		E.
6	"		"		·94		44	74	86	84		63	65		E.
7	"		Arkaringa Ck.		·94		53	65		73		58			S. & S.E
8	Arkaringa Ck.		"		·97			58		66		45	60		E.S.E.
9	"		"		30·20			52		55		51	54		N.E.
10	"		"					55				49			E.
11	"		"		·10		32	50		62		48	54		E.
12	En route		En route		·20			54		68		49	52		E. & N.E.
13	"		"		29·98			55		75		51	55		E.
14	"		"		·96			56		74		49			S.E. & E.
15	"		"		·83			55		75		51	55		N.E.
16	"		In camp		·48			59		72		50	56		N.W.
17	In camp		"		·36			61		74		57	58		S.W.
18	En route		En route		·61			61		70			56		S.E.
19	"		Wintana Well	1100	·36			59		70		53	54		E.
20	Wintana Well	1100	En route		·23			61		74		53	57		E. & N.
21	En route		"		·15					75			56		E.
22	"		"		·08			64		75		58	58		E. & S.E.
23	Arcoellina Well		Arcoellina Well		28·96		51	67		76		66	60		N.E.
24	"	1250	"	1250	·98		55	68		79		60	59		N.E.
25	"		"		·98		48	64		79		58	61		N.E.
26	"		"		·94		42	69		81		59	60		N.E.
27	"		"		·94		56	67		78		59	51		N. & N.E.
28	"		"		·86			61		65		58	61		S.W.
29	"		En route		·72			60		64		56	61		N.E.
30	En route	1600	"		·50			64		74		59	64		N. & N.W.
31	"	1800	"		·35			56		64		53	56		N. & N.W.

Day of Month.	Camp. Morning. No.	Height.	Evening. No.	Height.	Aneroid Barometer. 9 a.m.	9 p.m.	Temperature. Dry Bulb. Min.	9 a.	Max.	3 p.	9 p.	Wet Bulb. 9 a.	3 p.	9 p.	General Direction of Wind.
1	En route		En route		28·39			55		59		54	50		N.W.
2	Everard Range Depôt Camp	1950	Everard Range Depôt Camp	1950	·10		35	56	67			55			N.W.
3	"	"	"	"	·11		37	58	69	61		50	51		E.
4	"	"	"	"	·22		37	51	54	54		51	51		S.E.
5	"	"	"	"	·28		38	48	56	53		47	49		S.E.
6	"	"			·36		33	50	55	51		44	45		S.E.
7	"	"	Camp 1	1980	·59			48	59	57		42	48		S.E.
8	Camp 1	1980	Camp 2	1900	·33		27	51	68	65		46	51		S.W.
9	Camp 2	1900	Camp 3	1800	·26		33	56	66			50			S.E
10	Camp 3	1800	Camp 4	1875	·10		32	55	69	68		50	50		N. & S.W.
11	Camp 4	1555	"	"	·19		35	49	66	66		46	50		S.W.
12	"	"	"	"	·34		30	54	69	65		50	54		W.
13	"	"	"	"	·44		29	57	60	57		55	48		S.W.
14	"	"	"	"	·49		29	54	66	63		47	50		S.E.
15	"	"	"	"	·41		26·5	51	63	61		45	49		S.E.
16	"	"	"	"	·37		29	60	69	67		50	49		N.E. & S.W.
17	"	"	"	"	·43		28	52	67	63		44	49		E. & S.W.
18	"	"	Camp 5		·47		40	47	70	64		44	47		S·E.
19	Camp 5	1580	Camp 6	1575	·48		35	48	60	58		42	46		E. & S.E.
20	Camp 6	1575	"	"	·42		30	46	57	55		41	45		S.E.
21	"	"	"	"	·41		27	48	57	55		43	45		E.
22	"	"	Camp 7	1550	·29		24	48	63	61		40	47		E.
23	Camp 7	1550	Camp 8		·40		22	44	73	69		39	49		N.E.
24	Camp 8		Camp 9	1540	·53		24	51	70	66		44	49		S.W.
25	Camp 9	1540	"	"	·41		30	59	72	70		49	51		E. & N.W.
26	"	"	"	"	·25		34	59	69	69		49	58		N.W. & W.
27	"	"	Camp 10		·17		36	58	62	61		47	49		W.
28	Camp 10		"	"	·06		40	59	63	62		48	49		W.
29	"	"	Camp 11		·05			50		64		44	51		W.
30	Camp 11		Camp 12	1580	·31		26	55	68			46			W.

Day of Month.	Camp. Morning. No.	Morning. Height.	Evening. No.	Evening. Height.	Aneroid Barometer. 9 a.m.	9 p.m.	Temperature. Dry Bulb. Min.	9 a.	Max.	3 p.	9 p.	Wet Bulb. 9 a.	3 p.	9 p.	General Direction of Wind.
1	Camp 12	1580	Camp 13	1590	28·31		20	55				46			W.
2	Camp 13	1590	Camp 14	1730	·24		35	56	72	68		45	48		W.
3	Camp 14	1730	"	"											
4	"	"	Camp 15	1700	·18			64		78		46	54		W.N.W. & W.
5	Camp 15	1750	"	"	·21		42	62	75	71		51	54		W. & N.W.
6	"	"	"	"	·30		34	52	72	68		48	53		W.
7	"	"	Camp 16		·25		29·5	55	72	72		45	51		N.W.
8	Camp 16		Camp 17	1500	·32		27	48	70	69		44	51		W. & S.W.
9	Camp 17	1500	"	"	·37		34	46	57	56		42	45		W. & W.S.W.
10	"	"	Camp 18		·33		38	49	60	59		45	44		W.
11	Camp 18		Camp 19	1850	·26		40	54		61		46	52		Calm
12	Camp 19	1850	"	"	·19		29	54	71	70					W.
13	"		Camp 20	1835	·20		28	49							W.
14	Camp 20	1835	Camp 21		·15		29	49	69	65		44	47		W.
15	Camp 21		Camp 22	1750	·17		25	52	70	63		45	48		S.E.
16	Camp 22	1750	Camp 23		·26		32	51	68	62		42	48		S.E.
17	Camp 23		Camp 24		·65		26	50	71	65		42	46		E.
18	Camp 24		Camp 25		·71		33	54	67	67		42	47		E.
19	Camp 25		Camp 26		·72		24	50	77	68	41	40	47	31	E.
20	Camp 26		Camp 27	1355	·63		19	57	73	67	39	44	46	36	N.E.
21	Camp 27	1355	"	"	·44		29	57	70	68	45	42	47	32	E.S.E.
22	"	"	"	"	·45		26	55	71	71	46	42	47	36	S.E.
23	"	"	"	"	·54		25	51	68	65	47	42	47	36	E.
24	"	"	"	"	·57		24	52	70	67	48	45	47	41	N.E., E., S.
25	"	"	Camp 28	1475	·62		27	51	68	66	44	42	48	38	E.
26	Camp 28	1475	Camp 29	1400	·32		28	53	64	63	48	41	43	40	E. & S.E.
27	Camp 29	1400	Camp 30		·36			49	65	65	45	40	42	37	E.
28	Camp 30		Camp 31 (Fort Müller)	1517	·45		34	47	66	64	50	40	46	39	E. & S.E.
29	Camp 31	1517	"	"	·46		35	55	70	64	50	44	46	38	E.
30	"	"	"	"	·46		34	58	70	66	51	44	46	41	E.
31	"	"	"	"	·37		40	52	60	57	47	40	44	38	S.W., S., S.E.

Day of Month.	Camp. Morning. No.	Camp. Morning. Height.	Camp. Evening. No.	Camp. Evening. Height.	Aneroid Barometer. 9 a.m.	Aneroid Barometer. 9 p.m.	Temperature. Dry Bulb. Min.	Dry Bulb. 9 a.	Dry Bulb. Max.	Dry Bulb. 3 p.	Dry Bulb. 9 p.	Wet Bulb. 9 a.	Wet Bulb. 3 p.	Wet Bulb. 9 p.	General Direction of Wind.
1	Camp 31 (Fort Müller)	1517	Camp 31	1517	28·41	28·42	24	52	67	64	47	42	47	39	S.E.
2	"	"	Camp 32	"	·42	·43	32	47	78	70	50	43	50	40	E. & S.E.
3	Camp 32		Camp 33	1565	·32	·31	23	57	79	73	55	47	48	43	E. & S.E.
4	Camp 33	1565	"	"	·37	·35	25	54		71	58	46	50	38	E. & S.E
5	"	"	"	"	·35	·36	42		79		60			46	E.
6	"	"	"	"	·35	·34	24	60	72	71	59	45	51	39	S.E.
7	"	"	"	"	·34	·32	25	64	77	73	42	44	50	38	E.
8	"	"	"	"	·39	·35	29	59	73	70	57	46	50	43	E.
9	"	"	"	"	·41	·36	33	55	70	68	52	48	49	49	E. & S.E.
10	"	"	"	"	·33	·20	35	57	79	70	48	47	50	43	E.
11	"	"	"	"	·17	·16	35	64	79	75	54	48	53	42	N.E.
12	"	"	"	"	·24	·23	38	62	82	80	58	48	58	44	N.N.W.
13	"	"	"	"	·23	·19	39	68	82	80	62	50	57	48	N.E & N.W.
14	"	"	"	"	·37	·36	40	55	70	64	53	45	48	43	S.E. & E.
15	"	"	"	"	·41	·30	20	55	72	68	48	43	51	38	N.E.
16	"	"	"	"	·34	·31	28	63	80	79	64	41	51	44	S.W.
17	"	"	"	"	·50	·49	39	49	66	65	50	43	49	39	E. & S.E.
18	"	"	"	"	·54	·50	30	48	65	64	52	42	49	41	E. & S.E.
19	"	"	"	"	·58	·53	20	50	72	70	52	39	51	40	E.
20	"	"	"	"	·61	·53	28	58	74	72	54	46	51	40	E.
21	"	"	"	"	·58	·49	23	63	78	73	48	47	51	38	E.
22	"	"	Camp 34		·44	·29	35	67	85	82	64	48	54	44	N.N.E.
23	Camp 34		Camp 35	1590	·43	·43	36	58	79	72	58	48	53	41	E. & S.E.
24	Camp 35	1590	"	"	·51	·46	37	53	84	81	58	45	54	43	E. & S.E.
25	"	"	"	"	·34	·22	40	52	78	76	66	45	54	48	N.E. through E. to S.W.
26	"	"	"	"	·48	·42	41	50	66	65	49	46	49	40	S.E.
27	"	"	"	"	·53	·46	34	58	71	69	57	44	51	44	E.
28	"	"	"	"	·59	·51	44	62	73	70	51	46	52	42	N.W.
29	"	"	"	"	·58	·40	47	61	76	74	53	48	54	44	N.N.E.
30	"	"	Camp 36		·41	·40	48	31	81	76	49	44	52	39	N.
31	En route		Camp 37		·42	·50	39	70	85	82	55	50	55	42	N.E. & W.

Meteorological Observations. 1891—September.

Day of Month.	Camp. Morning. No.	Height.	Evening. No.	Height.	Aneroid Barometer. 9 p.m.	9 a.m.	Temperature. Dry Bulb. Min.	9 a.	Max.	3 p.	9 p.	Wet Bulb. 9 a.	3 p.	9 p.	General Direction of Wind.
1	En route		Camp 38		28·58	28·58	39	76	90	88	54	52	59	39	Calm
2	"	1600	Camp 39	1100	·51	·22	32	68	89	87	58	48	56	42	N.W.
3	"	1550	Camp 40		·31	·45	46	60	82	80	52	50	55	46	S.W.
4	"		Camp 41		·37	·66	30	56	68	65	51	44	50	44	N.E.
5	"	1680	Camp 42		·75	·64	28	51	68	68	50	44	56	46	E.
6	"		Camp 43		·55	·39	29	57	73	71	54	48	54	43	E.
7	"	1500	Camp 44		·37	·16	47	59	89	85	73	47	59	55	E. & N.E.
8	"		Camp 45		·40	·37	50	68	78	77	54	54	56	48	S.W.
9	"		Camp 46	1300	·49	·59	36	57	78	72	55	51	57	49	SE., SSW., & S.
10	"		Camp 47	1100	·75	·79	40	58	78	75	52	49	51	43	E.
11	"	1150	Camp 48		·75	·69	50	65	70	70	48	51			S.E. & S.W.
12	"		Camp 49	980	·77	·99		57	78	74	60	48	56	45	S.W., W., & S.E.
13	"		Camp 50		29·18	29·09	44	55	66	66	54	52	53	45	S.E. & S.W.
14	"		Camp 51		·13	·02	32	55	79	78	53	46	53	45	S.W.
15	"		Camp 52	850	28·99	·19	35	62	79	76	60	54	55	49	W. & N.W.
16	"		Camp 53		·63	28·89	36	55	55	51	49	49	50	43	S.W. & W.
17	"		Camp 54	1100	29·00	·96		59		66		49	52		N.E.
18	"		Camp 55		28·95	29·02	38	53	58	57	54	44	44	43	E. & S.E.
19	"		Camp 56		29·23	·24	35	52	61	58	49	47	49	43	S.E.
20	"		Camp 57		·32	·32	26	56	76	75	55	47	50	49	S.E.
21	"		Camp 58	750	·32	·20	34	55	76	75	49	50	53	46	E.
22	"		Camp 59		·21	·20	36	60	82	79	50	53	54	46	N.E.
23	"	1050	Camp 60 (Queen Victoria Spring)	836	28·95	·00	37	70	83	80	69	55	55	52	E.
24	Camp 60		Camp 60	836	29·20	28·97	41	75	90	87	67	55	57	48	N. & N.E.
25	En route		Camp 61		28·77	·60	41	74	92	90	68	54	60	55	N.E.
26	"		Camp 62	1160					95						
27	"		Camp 63	1000	28·73			65	98			52			
28	"		Camp 64	1450			60		80						
29	"		Camp 65	1100						69					
30	"		Camp 66	1000	28·90										

Day of Month.	Camp. Morning. No.	Camp. Morning. Height.	Camp. Evening. No.	Camp. Evening. Height.	Aneroid Barometer. 9 a.m.	Aneroid Barometer. 9 p.m.	Temperature. Dry Bulb. Min.	Dry Bulb. 9 a.	Dry Bulb. Max.	Dry Bulb. 3 p.	Dry Bulb. 9 p.	Wet Bulb. 9 a.	Wet Bulb. 3 p.	Wet Bulb. 9 p.	General Direction of Wind.
1	En route		Camp 67												
2	"		Camp 68	1250											
3	Camp 68	1250	"	"											
4	"	"	Camp 69 (Fraser Range)	1236											
5	Camp 69	1236	"	"	28·59	28·42	59	72	83	75	61				S.E. & S
6	"	"	"	"	·47	·46	40	66	80	77	59				S.W. & W.
7	"	"	"	"	·74	·75	51	66	73	69	66				S.W.
8	"	"	"	"	·73	·66	44	65	78	77	59				W.
9	"	"	"	"	·77	·78	49	50	68	68	58				W. & S.W.
10	"	"	"	"	·83	·81	37	57	78	76	55				
11	"	"	"	"	·87	·90	49	60	75	73	59				S.E.
12	"	"	"	"	·94	·90	53	58	74	69	62				S.E.
13	"	"	"	"	·91	·85	42	64	73	71	59				S.E.
14	"	"	"	"	·84	·74	40	60	77	73	61				S.E. & S.
15	"	"	"	"	·75	·78	58	68	77	73	55				W. & S.W.
16	"	"	"	"	·84	·86	51	57	78	76	65				W., S.W., & S.
17	"	"	"	"	·92	·86	45	55	78	78	59				
18	"	"	"	"	·85	·76	40	69	92	88	65				N.E.
19	"	"	"	"	·76	·76	55	85	98	96	79				N.E., E., & S.E.
20	"	"	"	"											
21	"	"	"	"											
22	"	"	"	"											
23	"	"	"	"	28·70	28·62	55	62	86	79	68				E. & S.E.
24	"	"	"	"	·64	·58	59	79	93	85	72				W. & N.W.
25	"	"	"	"	·79	·89	55	79	85	85	64				N.W. & S.E.
26	"	"	"	"	·95	·86	52	75	86	86	68				N.E. & S.
27	"	"	"	"	·86	·76	50	65	80	80	63				S.E. & N.W.
28	"	"	"	"	·77	·81		60	72	62	53				W., S., & S.E.
29	"	"	"	"	·87	·80	49	58	69	65	60				S.W. & S.
30	"	"	"	"	·82	.82	47	68	82	75	63				W. & S.W.
31	"	"	"	"	·94	·88	59	65	80	79	60				S.W. & S.

Meteorological Observations. 1891—November.

Day of Month.	Camp. Morning. No.	Height.	Evening. No.	Height.	Aneroid Barometer. 9 a.m.	9 p.m.	Temperature. Dry Bulb. Min.	9 a.	Max.	3 p.	9 p.	Wet Bulb. 9 a.	3 p.	9 p.	General Direction of Wind.
1	Camp 69	1236	Camp 69	1236	28·89	28·71	59	70	86	83	65				S.E. & S.
2	"	"	Camp 70	850	·73	·80	61	75	95	95	64				N., N.W., & W.
3	En route	1200	Camp 71	1200	29·05	·92	53	72	82	80	64				S.E. & S.W.
4	"	900	Camp 72		28·92	·90	41	70	89	85	96				E.
5	"		Camp 73	1500	29·06	·50	55	65	93	91	7[illegible]				E.
6	"		Camp 74	1100	28·58	·60	60	83	99	97	70				N.W. & S.W.
7	"	1050	Camp 75	1200	·81	·65	53	74	90	89	77				E. & S.E.
8	"		Camp 76 (Hunt's Well)	1250	·59	·62	63	75	90	90	72				
9	Camp 76	1250	"	"	·65	·63	60	77	102	100	70				E.
10	En route		Camp 77		·57	·43	65	80	101	97	81				
11	"	1500	Camp 78	1200	·46	·51	59	81	98	93	79				E. & S.E.
12	"		Camp 79		·62	·50	61	81	99	93	70				E.
13	"		Camp 80	1600	·44	·21	59	73	96	96	68				E. & N.E.
14	"		Camp 81	1650	·13	·23	56	87	98	96	67				N.W., W., S.E.
15	"		Camp 82		·41	·13	56	65	86	86	63				S.E. & S.
16	"		Camp 83	1750	·23	27·95	48	67	89	87	68				S.E. & E.
17			Camp 84	1600	·21	28·37	66	85	91	89	79				NE WNW., SW.
18	Camp 84	1600	"	"	·44	·51	50	70	90	90	69				S.E.
19	En route	1100	Camp 85	1150	·81	·68	56	72	86	81	69				S.E. & E.
20	"		Camp 86 (Southern Cross)	950											
21	Camp 86	950	"	"											
22	"	"	"	"											
23	En route		Camp 87		28·50	28·25		75	105	105	73				N.
24	"		Camp 88	1125	·27	·36	62	82	103	100	75				N.W. & S.W.
25	Camp 88	1125	"	"	·51	·58	59	77	89	88	68				S.E., S.W., W.
26	"	"	Camp 89	930	·87	·83	49	66	84	82	62				E. & S.E.
27	Camp 89	930	"	"	·87	·76	42	63	86	86	69				N.E. & E.
28	"	"	"	"	·81	·77	56	81	90	88	72				E.
29	"	"	"	"	·82	·71	59	82	96	88	69				E.N.E. & N.E.
30	"	"	"	"											

Day of Month.	Camp. Morning. No.	Height.	Evening. No.	Height.	Aneroid Barometer. 9 a.m.	9 p.m.	Temperature. Dry Bulb. Min.	9 a.	Max.	3 p.	9 p.	Wet Bulb. 9 a.	3 p.	9 p.	General Direction Wind.
1	Camp 89	930	Camp 89	930											
2	"	"	"	"		28·49			105	101	83		70	62	
3	"	"	"	"	28·42	·49	63	91	100	97	78	69	64	62	WNW,NW,SW
4	"	"	"	"	·62	·53	59	72	90	90	76	60	67	59	E. & S.E.
5	"	"	"	"	·61	·51	60	70	90	89	77	59	70	63	E.
6	"	"	"	"	·56	·49	59	72	89	88	75	63	69	62	E.
7	Camp 89	"	Camp 90		·43	·34	62	89	102	90	63	68	63	58	S.E., N.W.
8	En route		Camp 91	1200	·61		58	70				58			N.E.
9	"		Camp 92	1500	·37	28·09	54	69	97	91	74	54	58	55	
10	"		Camp 93	1600	·17	·28	52	72	89	81	68	59	66	55	S.W. & W.
11	"		Camp 94	1850	·35	·19	53	66	93	88	66	51	57	57	S.W., W.N.W.
12	"		Camp 95	1700	·22	·09	54	78	94	90	68	57	60	54	S.W.
13	"		Camp 96	1600	·29	·23	53	74	87	84	73	58	61	58	S.W. & W.
14	"		Camp 97	1500	·39	·17	56	80	95	92	71	61	61	51	W. & N.W.
15	"		Camp 98	1400	·33	·49	59	86	101	99	79	61	62	58	W.
16	"		Camp 99	1100	·62	·48	65	76	80	60	69	60	65	66	E. & S.E.
17	"		Camp 100	1000	·37	·57	66	86	98	96	78	64	65	63	W.
18	Camp 100	1000	"	"	·63	·61	67	96	104	104	81	66	65	61	S. & S.W.
19	En route		Camp 101	1150	·48	·41	69	94	106	105	88	85	69	63	E.
20	"		Camp 102	1500	·27	·18	69	93	105	104	84	64	66	64	N.W. & W.
21	"		Camp 103	1600	·27	·32	59	82	98	98	79	63	64	62	W. & S.W.
22	"		Camp 104	1200	·43	·55	64	86	93	91	78	59	63	60	S.E. & S.W.
23	"		Camp 105	1400	·63	·58	60	84	100	97	76	61	63	56	E.
24	"		Camp 106	1000	·59	·53	67	90	103	101	88	63	65	60	N.E., N., & S.E.
25	Camp 106	1000	"	"	·54	·45	68	95	108	107	95	62	67	64	E.
26	"	"	"	"	·48	·41	72	97	107	106	91	69	72	65	N.W. & W.
27	En route		Camp 107	950	·43	·30	75	96	109	108	85	69	66	62	W. & S.W.
28	"		Camp 108		·22	·33	69	89	109	108	83	61	64	59	
29	Camp 108		"	"	·38	·32	68	98	106	102	88	60	59	59	E. & S.W.
30	En route		Camp 109	1100	33	·28	69	89	105	101	86	65	68	66	
31	"		Camp 110	1400	·32	·08	72	90	106	106	84	66	68	63	N.E. & E.

Day of Month.	Camp. Morning. No.	Height.	Evening. No.	Height.	Aneroid Barometer. 9 p.m.	9 p.m.	Temperature. Dry Bulb. Min.	9 a.	Max.	3 p.	9 p.	Wet Bulb. 9 a.	3 p.	9 p.	General Direction of Wind.
1	En route		Camp 111	1600	28·14	28·07	65	89	105	102	87	64	69	69	E. & S.
2	"		Camp 112		·10	27·88	69	90	106	106	87	67	70	75	N.E., N., S.W.
3	"		Camp 113 (Annean Station)	1550	·18	28·10	75	82	100	95	90	72	72	74	N.E, N.W, S.W.
4	Camp 113	1550	"	"	·22	·23	69	90	101	100	80	75	76	70	W.
5	"	"	"	"	·27	·17	71	85	100	99	86	67	68	72	N.E.
6	"	"	"	"	·19	·10	78	97	104	102	86	70	72	70	N.E. & S.
7	"	"	"	"	·20	·16	78	93	105	103	92	69	71	64	NNW, NNE, S
8	"	"	"	"	·18	·10	81	95	110	109	96	68	72	66	N.E.
9	"	"	"	"	·10	·07	80	102	114	112	95	73	72	72	N. & S.
10	"	"	"	"	·23	·24	82	88	99	96	90	68	69	68	N.E.
11	"	"	"	"	·35	·31	75	78	88	84	82	64	65	65	N.E.
12	"	"	"	"	·30	·20	71	84	101	100	87	63	71	68	N.E.
13	"	"	"	"	·20	·10	72	92	108	107	92	64	65	68	N.E., N., N.W.
14	"	"	"	"	·13	·06	74	96	107	104	95	64	69	64	N.E., S.E.
15	"	"	"	"	·18	·12	79	95		107	92	62	68	68	N.
16	"	"	"	"	·18	·14	80	92	108	102	90	66	70	67	N.E., N.W.
17	"	"	"	"	·12	·06	77	92	108	104	89	67	68	64	N.E., S.W.
18	"	"	"	"	·14	·12	69	86	99	97	82	65	66	63	S.
19	"	"	"	"	·16	·12	78	92	108	102	88	68	70	66	E. & N.E.
20	"	"	"	"	·14	·10	68	84	97	93	82	62	62	64	S., E.
21	"	"	"	"	·13	·08	70	79	100	99	83	64	66	63	N.E.
22	"		"												
23	"														
24	"														
25															
26															
27															
28															
29															
30															
31															

Schedules of Latitudes and Longitudes of Camping Places Nos. 1-104, on Route of Elder Exploring Expedition,

From June 6th, 1891, to January 2nd, 1892, compiled by Mr. L. A. Wells, Surveyor to the Expedition.

Depot Camp—Starting point near Mount Illbillee, latitude 27° 3′ 0″, longitude 132° 30′ 0″.

Camp No.	Latitude.	Longitude (approximate).	Camp No.	Latitude.	Longitude (approximate).
	° ′ ″	° ′ ″		° ′ ″	° ′ ″
1	27 5 0	132 23 0	46	28 4 29	126 9 0
2	27 5 0	132 10 0	47	28 13 53	125 58 0
3	27 9 0	131 55 0	48	28 28 0	125 48 0
4	27 10 19	131 48 0	49	28 41 49	125 38 0
5	27 7 30	131 31 0	50	28 55 14	125 25 0
6	26 59 44	131 14 0	51	29 1 40	125 18 0
7	27 9 0	131 4 0	52	29 12 0	125 5 0
8	27 19 0	130 54 0	53	29 23 56	124 51 0
9	27 20 54	130 53 0	54	29 33 25	124 38 0
10	27 16 0 (approx.)	130 40 0	55	29 44 45	124 22 0
			56	29 54 35	124 9 0
11	27 28 0	130 38 0	57	30 5 12	123 54 0
12	27 33 35	130 34 0	58	30 14 5	123 41 0
13	27 32 30	130 28 0	59	30 25 48	123 28 0
14	27 25 0	130 23 0	60	30 25 45	123 20 15
15	27 27 0	130 9 0	61	30 25 0	123 8 0
16	27 20 19	130 5 30	62	30 44 31	122 57 0
17	27 20 19	130 4 0	63	30 54 0	122 45 0
18	27 16 0	129 57 0	64	31 6 7	122 32 0
19	27 13 0	129 52 0	65	31 17 0	122 38 0
20	27 11 0	129 48 0	66	31 30 45	122 45 0
21	27 9 0	129 30 0	67	31 44 3	122 41 0
22	27 4 0	129 24 0	68	31 57 44	122 35 0
23	26 55 0	129 8 0	69	31 50 56	122 45 0
24	26 50 0	129 58 0	71	31 42 3	
25	26 40 0	128 48 0	72	31 35 45	
26	26 32 0	128 36 0	73	31 26 20	
27	26 23 51	128 28 0	74	31 14 8	
28	26 18 50	128 20 0	75	31 6 30	
29	26 19 30	128 11 0	78	31 10 22	
30	26 13 0	128 1 0	80	31 11 5	
31	26 10 48	127 57 0	83	31 15 42	
32	26 7 30	127 47 0	84	31 15 2	
33	26 3 0	127 33 0	85	31 16 19	
34	26 8 0	127 32 0	89	30 58 56	
35	26 14 20	127 30 0	90	30 54 0	119 2 0
36	26 17 0	127 27 0	(Knuts ford)		
37	26 30 13	127 15 0	91	30 49 0	
38	26 39 8	127 7 0	93	30 35 50	
39	26 51 0	127 0 0	94	30 26 10	
40	27 40 0	126 56 0	96	30 4 10	
41	27 10 40	126 52 0	97	29 58 30	
42	27 28 30	126 45 0	98	29 44 50	
43	27 36 10	126 41 0	99	29 32 0	
44	27 43 35	126 34 0	100	29 20 0	
45	27 54 32	126 21 0	104	28 38 35	

List of Heights and Positions of Camps, Vertical Measurements.

Heights marked with asterisk are taken by hypsometer.

Camp or Name of Place.	Height in feet above sea level.	Height in feet above base.
Everard Range Camp	1950*	
Mt. Illbillee	3010*	1060
Ferdinand Creek ...	1800	
Camp 4	1575*	
Camp 5	1580	
Camp 6	1575	
Camp 7	1550	
Camp 9	1540	
Camp 11	1500	
Camp 12	1580	
Camp 13 (base of Coffin Hill)	1590	
Coffin Hill	1800	210
Camp 14	1730	
Camp 15	1700	
Camp 17 (base of Mt. Watson)	1500*	
Mt. Watson ...	2226*	726
Camp 19	1850*	
Mt. Sir Thomas ...	2535*	685
Camp 20	1835	
Mt. Sawback (Lindsay)	2300	550
Camp 22 (base of Mt. Sawback)	1750	
Camp 27 (base of Skirmish Hill)	1335*	
Skirmish Hill ...	1910*	580
Camp 28	1475	
Camp 29	1400	
Camp 31 (Fort Müller)	1517*	
Mt. Cooper (Cavenagh R.)	2175*	650
Camp 33	1565*	
Camp 35 (base of Mt. Squires)	1590*	
Mt. Squires... ...	2270	680
Townsend R. (continuation)		220
Terrace between Cs. 38 and 39	1600	
Camp 39	1100	
Sandstone Terrace (between Cs. 39 and 40)	1550	
Sandstone Cliffs (between Cs. 41 & 42)	1680	
Sandstone Ridge (near C. 44	1500	
Camp 46	1300	
Camp 47	1100	
Camp 48 (Mound Spring)	1150	
Camp 49	980	
Camp 52	850	
Camp 54	1100	
Camp 58	750	
Between Cs. 59 and 60, on top of the sandhills	1050	
Camp 60 (Queen Victoria Spring)	836*	
Camp 62	1160	
Camp 63	1000	
Camp 64	1450	
Camp 65	1100	
Camp 66	1000	
Camp 68 (base of Fraser R.)	1250	
Camp 69 (Simon's Hill)	1236*	
Peak of Fraser Range	2010*	765
Camp 70	850	
Summit of Ridge between Cs. 70 and 71	1300	
Camp 71	1200	
Remarkable Quartzite Bluff, between Cs. 71 and 72	1300	
Salt Lake, between Cs. 71 and 72	900	
Camp 73	1500	
Camp 74	1100	
Bed of Lake Lefroy	1050	
Camp 75 (south of Mt. Monger)	1200	
Camp 76 (near Hunt's Well)	1250	
Depôt Hill (N. shore of Lake Lefroy)	1500	

Camp or Name of Place.	Height in feet above sea level.	Height in feet above base.	Camp or Name of Place.	Height in feet above sea level.	Height in feet above base.
Camp 78	1200		Camp 99 (Lake Moore country)	1100	
Camp 80	1600		Camp 100 (Warne Flats)	1000	
Camp 81	1650		Camp 101 (S. of Mt. Kenneth)	1150	
Camp 83	1750		Camp 102	1500	
Camp 84	1600		Camp 103 (Canning Hills, Broad's Station)	1600	
Claypan between Cs. 84 and 85... ...	1100		Camp 104	1200	
Camp 85	1150		Camp 105	1400	
Camp 86 (Southern Cross)	950		Camp 106 (Watson's Station)	1000	
Camp 88	1125		Camp 107 (Jones' Station)	950	
Camp 89 (Lake Deborah)	930*		Camp 109 (Lake Austin country)	1100	
Camp 91	1200		Camp 110 (Townsend's Station)	1400	
Camp 92	1500		Camp 111 ...	1600	
Camp 93	1600		Camp 113 (Cruickshank's Station)	1550*	
Camp 94	1850				
Camp 95	1700				
Camp 96	1600				
Camp 97 (near Mt. Churchman)	1500				
Mt. Churchman (?)...	1800	260			
Camp 98	1400				

LICHENES.

By Dr. J. MUELLER.

[*Reprinted from "Hedwigia," heft 5, 1892.]

Trib. **Omphalarieae.**

1. Pyrenopsidium decorticans, J. Müll.

Thallus olivaceo-nigricans, demum decorticando obscure fusco-purpurascens, diffracto-areolatus ; areolae $\frac{1}{2}$ mm. latae et 2-3-plo minores, convexulae, hinc inde paucae connatae, fertiles quasi in apothecium hemisphaericum vertice latiuscule foveolatum et sat regulare et laeve abeuntes ; discus poriformis ; sporae in ascis circ. 30 — 40, globosae et globose-ellipsoideae, circ. 5 — 7 μ longae ; gonidia saltem pro magna parte rubricosa, vulgo didyma, hyphis varie moniliformibus cincta.

Species nulli nisi septentrionali *Pyr. granuliformi*, Forss. Gloeolich, p. 60 (Norrl. Hb. Lich. Fenn., n. 354), affinis est et ab ea jam extus forma et colore areolarum laevium et ostiolis amplioribus differt.

S. A. Arcoeillinna, ad saxa silicea.

Trib. **Cladonieae.**

2. Clathrina retipora, J. Müll., L.B., n. 589 ; *(Cladonia retipora*, Flk., Clad., p. 181). W.A. Karolin.
3. Clathrina aggregata, J. Müll., L.B., n. 589 ; *(Cladonia aggregata*, Eschw. Bras., p. 278). W. A. Warrangering ; terricola.
4. Cladonia alicornis, var. firma, Nyl. Syn., p. 191. S.A. Wawee Waterhole ; Everard Range. W.A. Victoria Desert (Camps 62, 66).
5. Siphula caesia, J. Müll.

Podetia laxe caespitosa, circ. 6 — 12 mm. alta, suberecta, superne undique caesia, inferne ochraceo-pallida, et e basi subtereti longe albo-radiculosa, superne flabellatim divisa, divisiones compressae, crassae, 1—2 mm. latae, nonnihil crenato-lobulatae et apice bifido saepe transversim dilatatulae. Apothecia ignota. Gonidia vulgaria, globosa, circ. 7 μ late. In lobulis hinc inde occurrunt gibbositates erumpentes, majusculae, nigrescentes, initia apotheciorum, secus lineam leviter intra-marginalem

* With corrected geographic references.—Ed.

sitae, sed fructificationis elemente haud ostendunt. Affinis est *S. coriaceae*, Myl.

W.A. Terricola, in Fraser Range.

Trib. **Heterodieae.**

6. Heterodea Mülleri, Nyl. Syn. L. Nov. Caled., p. 9.
   S.A. Everard Range. W.A., Warangering aliisque locis.

Trib. **Usneeae.**

7. Usnea barbata, var. scabrida (Tayl.), J. Müll., Lich. Nov. Gran., n. 20.
   W.A. Ramulicola, in Fraser Range.
   — — var. xanthopoga, J. Müll., L.B., n. 1476.
   W.A. Ramulicola, in Fraser Range.
   — — var. elegans, J. Müll., L.B., n. 1476.
   W.A. Ramulicola, in Fraser Range.

Trib. **Parmelieae.**

8. Theloschistes chrysophthalmus, var. Sieberianus, J. Müll., L.B., n. 581.
   W.A. Ramulicola, Fraser Range.
9. Xanthoria parietina, Norm. Conat. praemiss, p. 17.
   W.A. Rami-ramulicola, in Fraser Range.
10. Xanthoria controversa (Mass.) v. laciniosa; *Parmelia parietina*, v. *laciniosa*, Duf.; Schaer. Enum., p. 51.
    W.A. Ramulicola, in Fraser Range.
11. Physcia stellaris, var. acrita, Nyl., Scand., p. 111.
    S.A. Ramulicola, in Everard Range.
12. Physcia obscura, Nyl. Syn., p. 112.
    S.A. Lignicola, Everard Range.
    — — — var. virella, Th. M. Fries, Scand., p. 142.
    S.A. Corticola, in Everard Range.
13. Parmelia hypoleuca, f. coralloidea, J. Müll., L.B., n. 1145.
    S.A. Everard Range.
14. Parmelia tiliacea, var. minor, J. Müll., L.B., n. 46; corticola.
    S.A. Everard Range. W.A., Fraser Range.
15. Parmelia rutidota, Hook. fil et Tayl., in Lond. Journ. of Bot., III., 1844, p. 645; corticola.
    S.A. Everard Range. W.A., Fraser Range; Karolin.
16. Parmelia conspersa, Ach. Meth., p. 205; saxicola.
    W.A. Fraser Range.
    — — — var. corallina, Krplh. Lichfl. Bay, p. 135.
    S.A. Everard Range.
    — — — var. hypocleista, Nyl., Syn., p. 391; saxicola
    S.A. Everard Range,

— — — f. isidiosa, J. Müll., L.B., n. 575; ad saxa et ad terram sabulosam.
S.A. Everard Range.
— — — var. stenophylloides, J. Müll. Thalli laciniae breves, angustiores, subadpressae, subtus pallidae; saxicola.
S.A. Everard and Birksgate Ranges.
— — — var. stenophylla, Ach., Meth., p. 206; saxicola.
S.A. Everard Range.
— — — var. isidiosa. Thallus modice isidiosus; saxicola.
S.A. Arcoeillinna; Everard Range. W.A. Victoria Desert.

17. Parmelia adpressa, Krplh., Lich. Glaz., p. 15. S.A. Arcoeillinna.
18. Parmelia congruens. Ach. Univ., p. 491, Sw. L. Amer., t. 4; ad terram sabulosam.
S.A. Everard Range. W.A. Fraser Range; Karolin.
19. Parmelia amphixantha, J. Müll., L.B., n. 1312; ad terram.
W.A. Fraser Range.
20. Parmelia hypoxantha, var. major, J. Müll., L.B., n. 579; ad terram.
W.A. Fraser Range.
21. Parmelia dendritica. Pers. Wett., II., p. 16; saxicola.
W.A. Victoria Desert; Fraser Range.
– f. fuliginosa (Fr.); saxicola.

Trib. **Pannarieae.**

22. Heppia australiensis, J. Müll.

Thalli squamae obscure olivaceo-virentes, confertae, 1—2½ mm. latae, crassiusculae, ex orbiculari obtuse angulosae, v. margine demum minute adscendenti-microlobae; gonidia olivacea, glomeruloso composita; apothecia solitaria, minuta, evoluta ¾—1½ mm. lata, rufofusca et plana, superficie scabrida, hinc inde annulo tumente thallino nano cincta, caeterum superficiem thalli non excedentia; epithecium fulvum, lamina caeterum hyalina; asci fusiformi-ovoidei, polyspori; sporae globosae, 3½—5 μ diametro aequantes.

Species insignis, ad *Heppiam psammophilam*, Nyl. Symb. Sahar. e Biskra, n. 10, accedens, sed macrocarpa, et sporae minores, squamae non insculptae.

S.A. Ad terram, Wa-wee Waterhole.

23. Heppia acarosporoides, J. Müll.

Squamae nigrescenti-olivacéae, ½—1 mm. latae, orbiculares, integrae v. margine leviter undulato-crenatae, fertiles hemisphaericae, monocarpicae, in margine adpressae, haud insculptae; gonidia olivacea, modice composita; apothecia demum ⅓ mm. lata, regularia, immersa, non prominentia thallina cincta; discus

nigro-fuscus, depressus, nudus ; sporae in ascis numerosae, 4½—6 μ longae, globoso-ellipsoideae.

Affinis *H. australiensi*, sed squamulae aliae. Habitu bene accedit ad *Placodium castaneum*, Körb., sed gonidia sunt absolute alia.

S.A. Ad terram, Everard Range.

Trib. **Placodieae.**

24. Amphiloma murorum, var. miniatum. Korb. Syst., p. 111.
    S.A. Saxicola, prope Mount Watson.
    — — — — var. obliteratum, Korb Syst., p. 111.
    W.A. Saxicola, Fraser Range.
    — — — — var. areolatum, J. Müll.

Thallus crebre subareolatus, areolae periphericae hinc inde obsolete radiantes, turgidae, subtiliter crebre verruculosae, ochraceo aurantiacae. Sporae ut in specie. Quasi forma oblitera varietatis *aurantiacae*. Saxicola.

S.A. Near Arcoeillinna Well.

25. Placodium fulgens, var. bracteatum (Ach.), J. Müll., Lich. Pers. n. 14.
    S.A. Everard Range.

26. Placodium cervinum, var. percaenum (Schaer.), J. Müll., Lich. Pers. n. 23 ; calcicola.
    S.A. Foot of Everard Range. W.A. Fraser Range.

27. Placodium citrinum, J. Müll., L.B., n. 1414.
    Urceolaria citrina, Tayl. in Hook Journl. of Bot., 1847, p. 158.
    Lecanora Xanthophana, Nyl. L. And. Boliv., p. 379.

Lichen in Australia centrali siccione vulgaris, at rarius bene evolutus, habitu, magnitudine squamularum et colore flaviore aut magis virenti eximie varians, caeterum ad saxa et ad terram crescens.

S.A. Near Arcoeillinna Well, Everard Ranges, and various places in the vicinity.

Trib. **Psoreae.**

28. Psora decipiens, Hoffm., Lichenos., t. 43, figs. 1-3 ; Mass. Ric. p. 91 ; ad terram.
    S.A. Everard Range. W.A. Victoria Desert (Camp 46).

29. Psora psammophila, J. Müller.

Thalli squamae ½—2 mm latae, glauco-virentes, mutua pressione demum angulosae, caeterum orbiculares, planae, undulatim, gibboso inaequales, undique adnatae ; apothecia ½—1 mm lata, nigra, planoconvexa, primum tenuissime marginata, mox dein immarginata, saepe demum varie in majora composita confluentia,

intus nigra; epithecium et hypothecium nigrofusca; sporae octonae, ellipsoideae, 8—10 μ longae, circ. 6 μ latae.

A proxima *Ps. glauca* (Tayl.), J. Müll., L.B., n. 1423, recedit squamis planis, tenuibus, aliter coloratis et sporsis minoribus et colore thalamii.

S.A. Ad terram sabulosam, Wa-wee Waterhole.

30. Thalloidima australiense, J. Müll., L.B., n. 1158.

W.A. Ad terram prope Warangering.

31. Catolechia glomerulans, J. Müller.

Thallus olivaceo-nigricans, squamulosus; squamulae parvae et glomeruloso-aggregatae, bullato crassae, ambitu obtuse lobulatae, totae adnatae; apothecia $\frac{1}{2}$ mm lata, sessilia, nigra, plana, opaca, tenuiter et vix prominenter marginata, dein immarginata; epithecium nigrofuscum, lamina fuscidula; hypothecium late obfuscatum, paraphyses conglutinatae; sporae in ascis angustis 8-nae, 2-loculares, 12—14 μ longae, 5—6 μ latae, ellipsoidae et obovoideae, utrinque late obtusae, media obsolete constrictae. Thallus primo intuitue globoso-crustaceo in glomerulosum disruptus videtur, at squamulae cujusvis pulvinuli in peripheria hinc inde distincte leviter lobatae sunt. Apothecia in quoque glomerulo plura.

Prope *C. badiam* (Fr.), J. Müll., Lich. Costar., No. 58, inserenda est.

W.A. Ad terram subulosam rubidam prope Warangering.

32. Catolechia subcoronata, J. Müller.

Thalli squamae olivaceo-albidae, adnatae, orbiculares et obtuse angulosae, sat confertae, planae, gibboso-inaequales et demum reticulatim insculptae, circ. 1—1$\frac{1}{2}$ mm. latae; apothecia nigra, circ. 1 mm. lata, erumpentia, margine thallino accessorio grosse dentato-coroniformi et mox evanescente cincta, demum convexa et immarginata, nuda et opaca; epithecium et hypothecium nigrofusca; sporae 8-nae, ellipsoideae, subbiscoctiformes, biloculares, 12—16 μ longae, 5—7 μ latae. Ad terram.

Prima fronte potius speciem *Thalloidimatis* simulans, sed sporae ut in *Buellia*.

S.A. Everard Range. W.A. Warangering.

33. Catolechia marginulata. J. Müller.

Thalli squamae laete glaucae, convexae, crassulae, 1—1$\frac{1}{2}$ mm. latae, nonnihil obtuse angulosae, ambitu linea albicante cinctae et superficie polito-laeves; apothecia nigra, copiosa, $\frac{1}{2}$—1 mm. lata, novella haud coronata, sessilia, semper tenuiter nigro-marginata; epithecium et hypothecium nigrofusca; sporae 8-nae, ellipsoideae, circ. 12 μ longae et 7 μ latae.

Affinis *C. subcoronatae*, sed sqamularum minorum et crassiorum et eleganter marginatarum superficies alia et apothecia juniora non coronata.

S.A. Ad saxa arenacea prope Everard Range.

Trib. **Lecanoreae.**

34. Callopisma aurantiacum, Mass., Syn. L. Blasten, p. 9; saxicola.
    S.A. Everard Range. W.A. Fraser Range.
34a. — — — var. granulare, J. Müll., L. Parag., n. 82.
    W.A. Corticola, Fraser Range.
35. Lecanora subfusca, var. campestris, Schaer., Enum., p. 75; saxicola.
    No locality.
36. Lecanora caesio-rubella, Ach. Univ., p. 366.
    W.A. Corticola, Fraser Range.
37. Lecanora sphaerospora, J. Müller.

Thallus albidus, confertim v. sparsim glebuloso-areolatus; areolae irregulariter orbiculares, convexae, impresso-punctatae, gonidia globosa (vulgaria); apothecia in areolis solitaria iiscum primum, apothecia late albo marginata formantia, demum tenuiter albo-marginata; margo vix prominens, undulatus, intus linea tenui nigra zeorina haud emergente praeditus; discus planus, 1—1½ mm. latus, caesio-niger; epithecium nigrofuscum; hypothecium hyalinum; sporae in ascis 8-nae (semel 12 visae), vulgo biseriales, semper accurate globosae, diametro 6—8 μ aequantes.

Species forma sporarum insignita, habitu ad *L. sordidam*, Th. Fr., accedens et statu juniore fere *Lecanoram Hoffmanni* (sed albior) referens.

W.A. Saxicola, Victoria Desert et Fraser Range.

38. Lecanora calcarea, Smflt., var. caesio-alba; *Aspicilia contorta*, var. *caesio-alba*, Körb. Syst., p. 166.
    W.A. Saxicola, Fraser Range.
39. Lecanora pallescens, Fr., Lich. Europ., p. 132.
    W.A. Corticola, Fraser Range.
40. Rinodina Bischoffii Mass. Framm., p. 25.
    W.A. Saxicola, Fraser Range.
41. Diploschistes scruposus, Norm., var. arenarius (Ach.). *Urceolaria scruposa* var. *arenaria*, Ach. in Schaer., Spicileg, p. 75.

W.A. Ad terram arenosam, in Fraser Range et in ejusdem vicinitate.

Trib. **Lecideeae.**

42. Blastenia ferruginea Massal. Syn. Lich. blasteniosp., p. 14.
    W.A. Corticola, Fraser Range.
43. Lecidea planata, J. Müll., L.B., n. 1082; *L. plana*, Krplh Austral. n. 113 (non Lahm).
    W.A. Ad terram prope Warangering.

44. Lecidea (s. Sarcogyne) pruinosa, var. minuta ; *Sarcogyne pruinosa* v. *minuta*, Mass. Sched. crit. n. 335.
W.A. Saxicola, Fraser Range.
45. Buellia tetrapla (Nyl.), J. Müll., L.B., n. 1312.
W.A. Corticola, Fraser Range.
46. Buellia inturgescens, J. Müller.

Thallus ochroleuco-albido, crassiusculus, diffracto-aroelatus ; areolae primum confertae, planae, angulosae, dein subdistantes et turgido-convexae, laeves sed opaca, sessilia, $\frac{1}{2}$—$\frac{4}{5}$ mm lata, e plano et tenuiter marginato demum convexa et immarginata ; epithecium caerulescenti-aut virenti-nigrum ; hypothecia fuscum ; sporae 8-nae, 9—11 μ longae et circ. 6 μ latae.

A proxima abyssinica *B. toninioide*, Bagl., recedit apotheciis magis superficialibus, nec ex immerso adpressis et epithecio non fusco.

S.A. Camp 14, on granite.
47. Buellia spuria (Schaer.), Körb. Par., p. 183.
Saxicola. S.A. Arcoeillinna ;
48. Buellia subalbula, J. Müll., Lich. Aegypt., n. 49.
Lecidea subalbula, Nyl.; Lich. Angol., p. 11 et Lich. Larbal , n. 12.
S.A. Calcicola, Everard Range. W.A. Fraser Range
49. Buellia stellulata (Tayl.), Mudd Man., p. 216.
Saxicola. W.A. Cavenagh Range.
50. Buellia desertorum, J. Müller.

Thallus argillaceo-fuscus, crebre et minute diffracto-areolatus, areolae subcontiguae, angulosae, planae, medio concaviusculae, vix apotheciis aequilatae ; apothecia $\frac{1}{4}$—$\frac{1}{3}$ mm. lata, sessilia, juniore margine accessorio fugace pallido et tenuissimo mox evanescente praedita, demum alte convexa ; epithecium et hypothecium fusca ; sporae 8-nae, globoso-ellipsoideae, 7—9 μ longae et 6—7 μ latae, 2-loculares.

Juxta *B. fuscellam*, J. Müll, L.B. n. 1,438, locanda est, a qua jam apotheciis non adpressis mox elato-convexis et colore thalli differt.

W.A. Saxicola, Victoria Desert.

Trib. **Endopyrenieae.**

51. Endocarpon Helmsianum, J. Müller.

Thalli squamae fuscescenti-argillaceae, 5—13 mm. latae, suborbiculares, margine paullo angulosae aut leviter crenato-lobulatae, planae v. planiusculae, subundulato-inaequales, coriaceae, demum reticulato-insculptae, polycarpicae, subtus copiose et longe nigro-rhizinosae ; perithecia innata, integre nigro-globosa, circ. $\frac{1}{3}$ mm. lata ; ostiolum haud prominens, disculo orbiculari thallino fere $\frac{3}{10}$ mm. lato pallido-nigrescente centro pertuso et

linea nigra circumscripto indicatum; sporae in ascis geminatæ, superpositae, fuscae, circ. 35—50 μ longae et 12—18 μ latae, ambitu valde ludentes, crebre parenchymatosae; gonidia thalli subglobosa, 6—9 μ lata, hymenialia valde copiosa, 4—8 μ longa, vulgo 2—3-plo longiora quam lata, cylindrico-ellipsoidea.

Est species insignis, robusta, macrocarpa, gonidiis hymenialibus oblongatis.

S.A. Ad terram, Birksgate Range.

52. Endopyrenium hepaticum, Körb., Par., p. 302.
No locality.

Trib. **Pyrenuleae.**

53. Verrucaria calciseda, Dc., Fl. Fr., p. 317.
W.A. Saxicola, Fraser Range.

Trib. **Leprariaceae.**

54. Lepra citrina, Schaer., Spicil., p. 2.
S.A. Corticola, Everard Range.

FUNGI.

By Dr. M. C. COOKE.

Herbarium, Royal Gardens, Kew.

Polyporus sanguineus, *Meyer*.
S.A. Everard Range.
Fomes ramosus.
Trametes gusapatus, *B.*
Lenzites striata, *Fr.*
Polysaccum australe.
W.A. In sand, Victoria Desert (C. 58).
Geaster fimbriatus, *Fr.*
Geaster striatus, *D.C.*
W.A., Fraser Range.
Geaster Drummondi, *B.*
Podaxis carcinomalis, *Fr.*
Stephensia arenivaga, *Cooke* and *Masse*, "Grevillea," vol. XXI., No. 98, Dec., 1892.

Subglobose, irregular, or at length collapsed and cerebriform (4 to 6 c.m. diam.), pale, soft, becoming indurated, accumulating particles of sand, which become closely adherent; gleba soft, dirty-white, shrinking and becoming irregularly lacunose; asci clavate; sporidea 8, irregularly clustered globose, smooth, hyaline, 10 μ diameter.

S.A. On sandy soil, near Camp 9.

Diploderma sabulosum, *C.* and *M.*, op. cit.

Subglobose, 2-3 c.m. diam., pallid. External peridium thick, subgelatinous, collecting grains of sand, and becoming consolidated into a firm subglobose ball. Inner peridium membraneous, persistent, soon free within the outer hard shell, silvery white. Capillitium radiating, consisting of parallel fibres. Gleba dirty-white. Spores elliptical, smooth, 14 × 7 μ, pallid with a faint tinge of ochre.

W.A. On sandy soil, Victoria Desert.

CHARACEÆ.

By Dr. Nordstedt, of Lund.

Chara succincta, *Al. Braun.*
S.A. Cootanoorina.
Nitella cristata, *Al. Braun.*
W.A. Karoling.

ORTHOPTERA.

By J. G. O. TEPPER, F.L.S.,

Entomological Curator, Public Museum, Adelaide.

The Orthoptera collected by Mr. R. Helms, the naturalist of the expedition represents most of the groups of the order, the collection comparing very favourably in number and species with even the richest of the other orders. Considering the difficulties the capture and preservation of these insects present, the collection is so far satisfactory, but the many new forms exhibited among the comparatively small number indicate that very much is still to be learned.

There have been and still are only a few specialists for the order even in the Old World, and none in Australia. Their works, moreover, are published in several languages and difficult to obtain, forming mostly parts of the transactions of scientific societies, and only obtainable at irregular opportunities. It has therefore been impossible for me to identify or recognise the greater number with the certainty desirable, and while of these only a general and approximate list can be given, several families have been examined exhaustively, and revealed a number of forms new to science, so far as I am able to judge. As the collection of the requisite literature proceeds, and my other duties permit, detailed descriptions will be drawn up and published in due course.

The 101 specimens placed in my hands comprise about 26 genera, and 30—40 species. Owing to the delicacy and brittleness of their organs, many suffered considerably during the long, rough transit, notwithstanding the great care taken by the collector.

Forficularia (Earwigs).

Not represented.

Blattodea (Cockroaches).

Apolita decorata, *Tepper*. Fraser Range. One larva.
Ischnoptera longiuscula, *Walk.* (?). Cootanoorina. Three adults.
Epilampra Fraseriana, *Tepper*. Fraser Range. Two adult males, and one female larva.
Polyzosteria pubescens, *Tepper*. Fraser Range. Three adult males and two larvæ.
Polyzosteria Mitchelli, *Angas*. Victoria Desert, &c. Ten specimens.

Platyzosteria armata, *Tepper*. Fraser Range. One male, two females.

Platyzosteria albomarginata, *Brunner*. Barrow Range. One male.

Anamesia Lindsayi, *Tepper*. Everard Range. One male and female.

Pseudolampra punctata, *Tepper*. Between Victoria Spring and Fraser Range. One pair of adults and one larva.

Drymaplaneta obscuripes, *Tepper*. Fraser Range. One immature male.

Mantodea (Mantids).

Mantis sp. 1. Victoria Desert. One specimen. It resembles our common small green mantis, but is much smaller, &c.

Mantis sp. 2. Fraser Range. Two adults and one larva. It belongs to the type of *M. latistylis*, but different in many characters. It also occurs in other parts of South Australia. The native name is "Komvan," according to Mr. Helms.

Phasmodea (Stick-insects).

Podacanthus viridiroseus, *Cast.* Murchison. One female.

Podacanthus sp. Fraser Range. One male and four very young larvæ.

Lopaphus (?) sp. Fraser Range. One female.

Cyphocrania sp. Fraser Range. One female. Probably a dwarf form of *C. Pasymachus*, or closely allied.

Acridiodea (Common Locusts, antennæ short).

Choriphistes sp. Victoria Desert, Fraser Range. Two males, five females.

Cyrtacanthacris exacta, *Walker*. Same as last. Three adult specimens.

Tropinotus sp. Fraser Range. One male, two females, one nymph.

Eremobia (?) sp. Fraser and Barrier Ranges. Two adults and one nymph.

Rhomalea (?) sp. Victoria Desert. One pair of adults, of which the collector remarks, that the colour of their body so well harmonised with the rocks or ground they frequent, that it is difficult to detect them.

Pachytilus (Epacromia) sp. Everard Range. One female; a male from the Fraser Range appears to belong to the same species. Both are different from our common locust. According to the collector's note, the native name is "Yindilka."

Dactylotum (?) sp. Mount Squires, &c. Four adults (three males, one female) and six larvæ, apparently belonging to the same species, which is found in the Mount Lofty Ranges, near Adelaide. They are referred provisionally to this genus, and may require a new genus for their reception.

Besides the above, there are 13 specimens of small sizes, and from the Fraser Range chiefly, which belong to several species, but which I cannot at present locate with any reliability, on account of the lack of the requisite literature. I also beg to point out that for the same reason the names given are only provisional, indicating the affinity of the repective insects, until by more critical study their true position can be defined. It is surmised that a fair proportion will prove new.

Locustodea (Longhorned Locusts).

A. PHANEROPTERIDÆ.

Dictyotà Elderi, *Tepper*. Trans. Roy. Soc. S. Aust., XV., p. 99. Mount Squires. One male.

Taeniomena Fraseriensis, *Tepper*, op. cit., p. 108. Fraser Range. One male.

B. LOCUSTIDÆ.

Mecopoda (?) sp. Mount Squires. One female.

Saga (?) sp. Fraser Range. One female.

C. GRYLLACRIDÆ.

Paragryllacris deserta, *Tepper*, op. cit., p. 162. Cootanoorina. One adult male and three larvæ. Native name, "Billarbi" (*R. Helms*).

Ametrosomus Helmsi, *Tepper*, op. cit., p. 160. Blyth Hill and Barrow Ranges. Two adult males.

Gryllodea (Cricket-like Insects).

Schoenobates (?) sp. Fraser Range. One female. Quite unique in form, and probably new.

Among the Pseudo-Orthoptera (or Pseudo-Neuroptera) is a single Dragon Fly (*Agrionidæ*) and several species of Ant-lions (*Myrmelionidæ*). These, however, are reserved for critical study. When the requisite literature has been obtained they will be further reported on. It may, however, be remarked that the former appears to be identical with one of our common species, and the latter different from anything hitherto found in the settled part of the province.

VERTEBRATA.

By E. C. STIRLING, M.A., M.D., C.M.Z.S., Hon. Director South Australian Museum, and A. ZIETZ, Assistant Director S.A. Museum.

[Plates VI. and VII.]

MAMMALIA.

The mammals collected by Mr. R. Helms are comparatively few in number, and represent only a few species, but the journey has added some interesting information respecting their distribution. The collection comprises twenty specimens, including one skull and two skeletons, and represents eight species.

Myrmecobius fasciatus, *Waterhouse*.

Everard Range. One dried skin.

Trichosurus vulpecula, *Kerr*.

One dried skin of this well-known and widely-distributed species from the Everard Range. A rufous tinge is particularly conspicuous on the scapular region and neck.

Lagorchestes hirsutus, *Gould*.

One old male (skin), one young, sex unknown (skin), and one young male taken from the pouch (in spirit). These were taken in the Porcupine grass *(Triodia irritans)* country, south of the Barrow Range, before the exploring party entered the Victoria Desert. Gould's type, of which he gives an excellent figure in his "Mammals of Australia" was obtained in Western Australia.

The following description refers to the largest male specimen, which has been mounted. It is apparently an adult:—

Rhinarium nearly wholly covered with gray hair, lips white. General colour above finely grizzled-grey, intermixed with rufous-brown, which is more conspicuous on the rump and on the outside and back of legs. The fur of the back is, for half its length next the skin, nearly black: a yellowish brown-tinted area, around the eye, extends to root of ear; back of ears grizzled-grey, their insides and edges white. Arms, hands, front of legs and feet pale. Tail short-haired, black above and towards the point, grey on sides and root, its under-surface with short white glossy hair. Length of hindfeet four and a half inches, of tail ten inches, total length of specimen (stuffed) about thirteen

inches. The tail, which is much laterally compressed, is pyriform in section, with the broad end uppermost, and has a distinct tendency to coil inwards for about its terminal half. This feature is very-well shown in the youngest specimen preserved in spirit. The larger male has much resemblance, in general appearance, to a female specimen of *L. leporoides* in the S.A. Museum. Both specimens are about of equal size, but *L. leporoides* has a more nearly uniformly light-coloured tail and proportionally longer hindfeet. The longer and more slender tail of *L. hirsutus* is conspicuously dark and the hindfeet are fully an inch shorter. The skulls of both specimens show no marked differences. The younger skin of an individual rather more than half-grown (mounted) has the skin injured in such a way that the sex cannot be distinguished. It has the brown zone round the eye prolonged to the sides of the muzzle.

Mr. Streich informs us that this animal appears to be numerous in the northern parts of the Victoria Desert, where it often falls the prey to the Wedge-tailed eagle.

Onychogale lunata, *Gould.*

A young male from the Everard Range.

The white mark behind the base of the forelimb is not nearly so distinct as is shown in Gould's figure. A female collected on the transcontinental journey of His Excellency the Governor, the Earl of Kintore, has apparently a proportionally longer tail, but it is possible that this is owing to a deficiency of the tip in the former case.

Petrogale lateralis, *Gould.*

Male, female and young (taken from the pouch) obtained at, or near, the Barrow Range.

These specimens are more conspicuously marked than others which were collected by Dr. Stirling in the neighbourhood of Alice Springs in 1891. The dark-brown markings are of a deeper tinge, but the whitish or yellowish markings more faintly shown. Beyond these we are unable to detect any other differences which would justify a specific separation of these specimens from those collected at Alice Springs. It seems to have a wide range in the mountainous or rocky districts of the interior. Those in the British Museum were collected on the N.W. coast and Swan River District, W.A.

Macropus robustus, *Gould.*

One skull, Victoria Desert.

Hapalotis Mitchelli.

Three immature specimens, Fraser Range. This species has a wide range in the interior of Australia.

Mus albocinereus (?), *Gould.*

A small species of *Mus* from the Murchison District.

Tail, 3·72 inch; head and body, 3·25 inch. The fur has a brownish-grey tinge, the under-surface lighter coloured, feet and lips whitish.

It agrees approximately with the description of *M. albocinerens*, Gould; but in the present imperfect knowledge of the Australian representatives of this group we cannot confidently affirm that this specimen belongs to that species.

AVES.

This series consists of eighteen skins, two skeletons, eight nests and sixteen eggs.

We have throughout adopted the nomenclature of Dr. Ramsay's "Tabular List of Australian Birds."

Aquila audax, *Lath.*

Victoria Desert. One specimen, apparently an old female. Above and below, blackish-brown; neck rufous, under tail-coverts of a rusty tinge; median wing and upper tail-coverts yellowish-brown. Each feather is shaded with dark-brown in the centre.

Two eggs (taken from the same nest in a Bloodwood tree (*Eucalyptus tessellaris*) between Camps 23 and 24 (Blyth Range) show the usual markings of this species. One is smaller and also much lighter-coloured than the other.

Aquila morphnoides, *Gould*

One egg, which we refer to this species, was taken at Mt. Squires from a nest built in a Eucalyptus-tree. The bird was not seen at the time.

Hieracidea berigora, *V.* and *H.*

Three males (Barrow Range), and one female (Cavenagh Range). These birds correspond most nearly with Mr. Sharpe's description of the species in the British Museum Catalogue.

Hieracidea orientalis, Schlegel. One female. Murchison District. This specimen answers most nearly to the species described under this name in the British Museum Catalogue. In the South Australian Museum is the skin of a female shot in the neighbourhood of Lake Albert, which conforms to the description of *H. berigora*, while two of its young, taken from the nest at the same time and kept until six months old, agree in all essential particulars with the description of the young of *H. orientalis*. From this fact, and from careful inspection of a large series of birds from various localities which approximately answer to the descriptions either of *H. berigora* or of *H. orientalis*, it is

evident that both these alleged species are subject to considerable colour-variations; and we have been unable, after careful examination and measurements, to detect any such differences as should entitle them to be ranked as distinct. We, therefore, consider that Schlegel's *H. orientalis* is merely a variety of *H. berigora*, into which latter, as the type of the genus, the former should be merged. We can, further, detect no difference between eggs in the South Australian collection which are ascribed respectively to the two species.

A nest of *Hieracidea*, sp., was found upon the burnt trunk of a tree, about three feet from the ground, in the Victoria Desert (Camp 57).

Cheramœca leucosterna, *Gould.*

Camp 9. One specimen.

Oreoica cristata, *Lewin.*

Barrow Range. One male which conforms with Gould's description.

Oreoica sp.—A second male specimen of *Oreoica*, considered by Mr. Helms to differ from *O. cristata*, because the blacks of the Barrow Range district distinguish it by a separate name, is possibly the same bird in its immature plumage, but as the specimen previously referred to and a female of the same species from Mildura (Victoria) are all we have for comparison, it would be unsafe at present to declare the bird under consideration to be a distinct species. This specimen has the base of the beak light brown. Both specimens from the Barrow Range appear to have the beak proportionally stronger and wider vertically than the Mildura-specimen.

The black markings on the head and breast, and also the white face, are very faintly indicated by darker and lighter shades of brown. The crown of the head, which in the male specimen of *O. cristata* is deep black, is in this specimen very faintly marked and mixed with grey. The greyish tinge of the neck gradually changes into fawn-colour towards the rump, and the latter tint is more vivid on the upper- and under tail coverts. Under surface and sides fawn coloured, the latter being the darker. Feathers of the upper surface, wing and tail brownish, margined with fawn-colour.

Chlamydodera guttata, *Gould.*

Three beautiful male specimens of this species, which apparently is still rare in Museums, were collected in the Barrow Range. They agree with *C. maculata* in respect of size, but the colourings are far more vivid.

Mr. Helms informed us that this bird is not uncommon in the locality mentioned.

Epthianura tricolor, *Gould.*

A male bird and a nest containing two eggs which, according to Mr. R. Helms, had undergone a week's incubation, were collected near Arcoillinna Well, S.A.

A second nest, also containing two eggs, was found near Camp 1 (Everard Range).

Both are composed of fine grass-stems, rootlets, and the silky-white stems and leaves of some "everlasting."

Epthianura aurifrons, *Gould.*

A nest containing three eggs was obtained near Arkaringa Creek, S.A.; it was found in the midst of a small saltbush.

The description of the bird seen near the nest by Mr. Helms undoubtedly refers it to this species. The nest is composed of fine grass-stems, rootlets, and dried yellow flowers.

Cinclosoma castaneonotum, *Gould.*

One male bird in spirit, nest and one egg. With regard to these specimens Mr. Helms notes that the nest was found in the Victoria Desert in Spinifex *(Triodia irritans)*, by Mr. D. Lindsay. It contained one egg only, which was in an advanced stage of incubation. Mr. Lindsay asserts that the nest is made by this bird. Two other eggs were obtained near the Everard Range, but they were too decomposed for preservation.

The egg taken from the above-mentioned nest is much more elongated than two others which will be mentioned in the next paragraph. It is also much more minutely punctated, but bears undoubtedly the character of a "Cinclosoma" egg.

A second nest and two eggs, which apparently belong to this species, are accompanied by the following note from the collector:—"The nest and two eggs were found during a flying trip about thirty miles south of Camp I., Everard Range. Unfortunately, the structure of the nest was such as to prevent my being able to preserve it intact, in the circumstances under which we travelled on that occasion, although I took the greatest pains to do so. It was found at the base of a low bush, of the bark of which it is constructed. The bird itself I did not see, but the natives told me their name for it was *milka*. On seeing the egg they said, '*Milka nokum*,' *nokum* being egg."

The remains of the nest consist of narrow strips of bark, and it was evidently constructed on the same plan as that of *C. punctatum*, which, according to Mr. North, is also a rather loosely built structure composed of fine strips of bark, grass, and leaves.

One of the eggs (A) is bluish-white, freckled with sepia-brown markings intermingled with others of a bluish-grey, which latter

appear as if underneath the surface of the shell; some of these markings are large, others very minute.

The second egg (B) is creamy-white, but the markings are much larger, especially towards the larger end.

Dimensions.—(A) 1·19 x 0·81 inch; (B) 1·18 x 0·67 inch.

CACATUA ROSEICAPILLA, *Vieillot.*

Barrow Range; two specimens.

REPTILIA.

ORDER LACERTILIA.

The large number of one hundred and sixteen specimens, representing thirty-seven species, proves the abundance of this class of animal life in the arid regions of Australia traversed by the Expedition and also indicates the zeal and energy of the collector under the peculiarly difficult circumstances of Australian exploration.

Five species of this order have been hitherto undescribed; of these four were collected for the first time by the Elder Expedition and a full description of them is here given. One species having been previously collected by Dr. Stirling on the occasion of His Excellency's transcontinental journey, its description is reserved for the zoological report of that expedition shortly to be published.

The classification and details of measurement are those adopted by Boulenger in the "Catalogue of Lizards in the British Museum Collection."

The following families are represented:—Geckonidæ, 8 species; Pygopodidæ, 3 species; Agamidæ, 10 species; Varanidæ, 2 species; Scincidæ, 14 species.

Family GECKONIDÆ.

NEPHRURUS PLATYURUS, *Boul.*

One specimen taken at Victoria Springs and two others between the Everard and Fraser Ranges; found under tussocks of Spinifex grass *(Triodia irritans).*

Total length of the largest specimen	88	mm.
Head	23	"
Body	50	"
Tail	15	" (reproduced)
With of head	20	"
Length of forelimb	29	"
Length of hindlimb	36	"

The locality, Adelaide, as stated in the "British Museum Catalogue," is incorrect; this species inhabits the dry waterless country of the interior of the Australian Continent.

RHYNCHŒDURA ORNATA, *Günther.*

Native name, "Piur."

Two specimens of this little-known lizard from the Everard Range.

Total length	...	...	...	...	86 mm.
Head	...	...	...	...	9 "
Body	...	...	...	...	43 "
Tail	...	...	...	...	34 "
Width of head	...	...	...	...	8 "
Length of forelimb	...	...	...		16 "
Length of hindlimb	...	...	...		19 "

Ground-colour reddish-brown, largely and irregularly reticulated with blackish-brown and marked with large round whitish spots, of which the larger ones, of about 2 mm. diameter, form two lateral rows In one specimen these spots form seven curved lines on the back with the concavity towards the head ; in the other these spots are not so regularly arranged. Upper part of the head of a ground colour, similar to that of the body. A row of three to four white spots commencing midway between the nostril shields extends backwards as a median line to midway between the eyes. Upper eyelid dark, but very distinctly marked with white in front of the eye. The tip of the beak-like snout is white. A blackish curved band extends across the occiput. Underside cream-coloured, without any markings. The two specimens from which this description has been compiled were fresh, and well-preserved in spirit, but one had lost its tail.

GYMNODACTYLUS MILIUSII, *Bory.*

Between Fraser Range and Southern Cross. November, 1891.

Only one specimen of this common and widely-distributed species was collected. It has a total length of about 60 mm.

HETERONOTA BYNOEI, *Gray.*

Two specimens collected ; one at or near the Barrow Range, the other between the Fraser Range and Southern Cross (Yilgarn). The former is an immature specimen, the second of about 100 mm. total length. This species has a wide range.

DIPLODACTYLUS SPINIGERUS, *Gray.*

Native name, "Yed."

Fraser Range ; three specimens.

Total length of largest specimen, 90 mm.

DIPLODACTYLUS TESSELLATUS, *Günther.*

Everard Range ; two specimens.

A patch of curved conical spines on each side at the root o

the tail, their length being in one specimen about 1 mm., in the other the spines are only half this length. Fourteen pairs of enlarged tubercles on the dorsal surface of the tail. Between the rings bearing these large tubercles are rings with generally three to four rows of smaller tubercles, which are equal in size to those on the dorsum. The second specimen has similar rings of tubercles on the tail, which latter, however, appears to have been reproduced. This is the first time that a specific locality has been assigned to this species.

Diplodactylus Elderi, *spec. nov.* Pl. VI., figs. 1 and 1*a*.

Barrow Range; one specimen.

Head oviform, convex; snout rounded, a little longer than the distance between the eye and ear-opening, and more than once and a-half the diameter of the orbit; ear-opening minute, oblong, vertical, 1 mm. long. Body moderately elongate, depressed. Limbs moderate; digits much depressed, with large transverse lamellæ inferiorly, five being under the fourth toe, of which the distal is incised and cordiform.

Colour.—Brownish-grey above, covered with small smooth granules, intermixed with larger ones of different sizes, which are very white and glossy; these form the centre of black annuli, which are sometimes confluent and arranged in very irregular disposed oblique or transverse rows; on the sides of the body they are more scattered, and become smaller on the limbs. Under-surface light-coloured; on the belly large whitish spots form two median and two lateral longitudinal rows. Tail short, pyriform.

Total length	65 mm.
Head	13 "
Body	38 "
Tail	14 "
Width of head	10 "
Length of forelimb	17 "
Length of hindlimb	18 "

Gehyra variegata, *Dum. & Bibr.*

This widely-distributed species was obtained at the following localities:—Two specimens, Barrow Range, one of 110 mm. total length, very light-coloured and indistinctly marbled with darker shades; the second (97 mm.) dark grey, variegated with darker shades. One immature specimen (55 mm.), between Barrow and Everard Ranges. One specimen (85 mm.), Fraser Range, with irregular dark bands across the back. One immature specimen (56 mm.) from Queen Victoria Springs, light greyish, variegated with darker shades; small white spots scattered over the head,

each corresponding to three or four tubercles. One immature specimen (62 mm.) with a dark streak crossing each eye and continuing to about the middle of the back.

Fam. PYGOPODIDÆ.

Pygopus lepidopus, *Lacep.*

One specimen of this well-known lizard from the country between the Queen Victoria Springs and Fraser Range has the following measurements :—

Total length	...	...	...	...	260 mm.
Head	...	...	...	...	13 "
Body	...	...	...	...	85 "
Tail	...	...	...	...	162 "
Width of head	...	...	...	...	7 "
Length of hindlimb	...	...	...		4 "

Slate-coloured with three dorsal longitudinal rows of elongated blackish spots ; throat uniformly salmon-coloured without markings.

The second specimen, a female (with well-developed ova), taken at Yilgarn, is uniformly slate-coloured on the dorsal aspect and pinkish below. A number of indistinct darker vertical streaks slanting forwards on each side of the anterior part of the body, gradually disappearing towards its middle.

Delma impar, *Fisch.*

One specimen found under "Spinifex" near Everard Range.

Total length	...	...	...	...	265 mm.
Head	...	...	...	...	10 "
Body	...	...	...	...	55 "
Tail	...	...	...	...	200 "
Width of head	...	...	...	...	5 "
Length of hindlimb	...	...	...		3 "

Dark olive green on the back and head, the sides of the body and under-surface white. Each scale of the back and sides of the body has a dark centre, thus forming fourteen dark longitudinal lines. Ventral scales with dark spots in the centre. A second specimen of the same size and with similar markings was obtained in the Barrow Range.

Lialis Burtoni, *Gray.*

Two specimens ; 30 miles south of Camp. 1, Everard Range. One specimen approaches most nearly to Boulenger's Var. D. of this species.

Length of body	...	..	95 mm		
Head	...	...	...	8 "	
Tail	...	...	...	?	(incomplete).

Length of snout about equal to distance from eye to ear-opening. Upper-surface slate-coloured; a vertebral line and two lateral lines of a darker shade. The dark vertebral line divides into two separate lines on the neck, which unite again at about two-thirds of the distance between the eyes and tip of the snout. A white labial band is prolonged along the sides of the body; this band is bordered on each side by minute white spots. Under-surface light grey; a white line along the middle of the throat, which bifurcates at about 20 mm. distance from snout, and the two branches extend over the tail.

The measurements of the second specimen are as follows:—

Total length	303 mm.
Length of body	177 "
Head	23 "
Tail	103 "

The ground-colour of the upper-surface is dark-grey, minutely punctated with brown; three dark-brown lines along the back; under-surface with white spots, which are margined with a brick-red colour. Length of snout equal to distance from eye to ear-opening.

Fam. AGAMIDÆ.

Amphibolurus maculatus, *Gray*.

Three specimens—two apparently adult and one young—of this beautiful lizard were obtained in the Barrow Ranges, and a fourth in the Victoria Desert near Queen Victoria Springs.

All these agree with Boulenger's description except in respect of their markings, which are as follows:—Above brick-red with a series of small bluish-grey spots along the vertebral line. The lateral lines are composed of similar spots, which are partly confluent. Four bluish-grey lines mark the upper-surface of the anterior third of the base of the tail; the two median then becoming confluent, three lines are continued to the tip. The remainder of the tail, sides of body, head, throat as well as a large patch, which covers most of the under surface and the inner surface of the hindlimbs are deep-black, but a narrow yellowish uncoloured streak on each side of the body is left, which connects the forelimbs with the hindlimbs. The remainder of the under-surface as well as the lips are yellowish-white.

	Sp. A.	Sp. B.
Total length	163 mm.	175 mm.
Head	15 "	15 "
Body	36 "	40 "
Tail	112 "	124 "
Width of head	12 "	12 "
Length of forelimb ...	24 "	24 "
Length of hindlimb ...	48 "	48 "

The Λ shaped black mark on the throat to which Boulenger refers to in his description is not traceable in our specimens; but as we have seen it absent also in specimens of *Amphibolurus Adelaidensis* (the whole throat being sometimes uniformly black), we have no doubt that this feature is subject to great variation. The third specimen (the young one) has dark mottling on the the throat only.

Amphibolurus rufescens, *sp. nov.* Pl. VI., figs. 2 and 2*a*.

Three specimens. Mount Sir Thomas, Birksgate Range, S.A.

General Aspect. Body proportionally short, head moderately large, snout as long as the diameter of the eye-opening. Nostrils situated below the canthus rostralis, and directed upwards, nearer the eye than the end of the snout. Upper head-scales large, strongly keeled, largest towards the snout and on the canthus rostralis, smallest on supra-orbital region, but gradually decreasing in size towards the neck. Sides of neck plicated. A low nuchal crest. Gular scales small, about half the size of the ventrals; these are very slight and obtusely keeled. Scales on sides of body small, but increasing in size towards the vertebral line. The scales on tail and upper-side of limbs are large and strongly keeled, and on the middle line of the upper surface of the tail are intermixed with a few larger ones. Limbs and digits proportionally long, the adpressed hindlimb reaching almost to the tip of snout. Fifty-eight femoral and anal pores form on each thigh an uninterrupted line; the series of each side separated in the præ-anal region. Tail slender, tapering very gradually towards its point.

Colour. Above, rusty-brown, with dark spots more or less regularly arranged in pairs along the vertebral line; each pair sometimes confluent. A similar single series of dark spots corresponding with the lateral line. Under-surface dirty yellowish-white; chest olive. Throat and gular region with irregularly disposed dark markings on a cream ground-colour, being most distinct in the two smaller specimens.

	Sp. A.	Sp. B.
Total length	228 mm.	210 mm.
Head	22 "	17 "
Body	66 "	47 "
Tail (injured)	140 "	146 "
Width of head	18 "	14 "
Length of forelimb ...	35 "	33 "
Length of hindlimb ...	78 "	60 "

Amphibolurus cristatus, *Gray.*

Between Queen Victoria Springs and Fraser Range; one specimen.

General Aspect.—Slender. Head moderately large; snout as long as the diameter of the orbit, with subangular canthus rostralis; nostrils below the canthus rostralis, a little nearer the eye than the end of the snout; tympanum large, its width a little less than the eye-opening. Upper head-scales large, subequal, rugose and strongly keeled; they are largest towards the snout and on the canthus rostralis, smallest above the orbit. Neck long, its sides strongly plicated and spinose; nuchal crest well-developed, composed of separate compressed spines. The dorso-lateral fold with spine-like scales, which are largest on each side of the neck; a serrated ridge or crest along the back extending to about the first-third of the tail. Body much laterally compressed, covered above with small keeled scales, which are larger and most carinate on the middle of the back, and more minute on the sides; much larger isolated scales intervening. Ventral scales small, smooth or very slightly keeled. Limbs and digits very long, the adpressed hindlimb reaching beyond the tip of the snout; the length of the foot equal to the length of the rest of the forelimb; scales similar to those on the back. A series of seventy pores extending along the whole length of the thighs, uninterrupted in the præ-anal region. Tail very slender, laterally compressed, more than twice as long as head and body; caudal scales equal, keeled, a few larger ones at the base of the tail.

Colour.—Dark olive above, head and neck marked with much ochraceous-yellow. Tail with alternately dark and light annuli. Under-surface yellowish, median parts of the throat, chest and inner-surfaces of limbs black.

Total length	340 mm.
Head	22 "
Body	83 "
Tail	235 "
Width of head	20 "
Length of forelimb	40 "
Length of hindlimb	98 "

AMPHIBOLURUS SCUTULATUS, *sp. nov.* Pl. VII., figs. 1 and 2.

Between Fraser Range and Queen Victoria Springs.

Of this species we have several specimens of each sex. At the first glance it much resembles *Amphibolurus cristatus*, but differs in the following respects:—

All the scales are much smaller, the head-scales not rugose as in *A. cristatus*, but smooth and strongly keeled. The dorsal scales are not intermixed with larger ones, but increase in size towards the vertebral line. The compressed spines of the nuchal

crest are shorter. The male specimens in this series are generally larger than the females.

Male.—Upper surface of a pale rusty-brown ground-colour, intermixed with ashen-grey, which in some specimens forms four to five indistinct transverse bands across the back for its whole length. Middle of throat, chest and under-surface of limbs black. A lanceolate black gular mark is not confluent with the black shading of the chest. On each side of the vertebral region extends a continuous lozenge-pattern marked out in pale reddish-brown, each lozenge containing darker markings in the centre. In other instances the elements of the pattern are not continuous and of a rounded shape approximating to ocelli. Neck marked with two to four fairly regular alternate bands of dark yellowish-brown, which in some specimens extend along the back, where they disappear. Sides with irregular dark-brown or black markings disposed on a ground of yellow or yellowish-brown, the dorsal ashen-grey stripes also extending into this region.

Limbs and tail dark rusty-brown, transversely crossed with indistinct paler bands. Under-surface yellowish. In *A. scutulatus* the chest marking is more elongated, and extends as far as the junction of the hindlimbs. Under-surface of the tail uniformly light-coloured. The male with fifty præ-anal and femoral pores, forming an uninterrupted series on each side, absent in the female.

Total length	325 mm.
Head	25 "
Body	75 "
Tail	225 "
Width of head	18 "
Length of forelimb	40 "
Length of hindlimb	80 "

Female.—Very similar in markings to the male, but in most specimens the chain of lozenge-shaped lateral markings is broken up into a series of light-edged ocelli; these are generally irregularly roundish or oval and often confluent; in some specimens they assume the shape of a series of figures of 8. Under-surface uniformly light-coloured, the black markings on throat and chest very faint or, on the latter, totally absent.

Total length	170 mm.
Head	20 "
Body	60 "
Tail	90 "
Width of head	—
Length of forelimb	32 "
Length of hindlimb	73 "

No femoral and anal pores.

Most of the above specimens of this very agile lizard, which lives in sandy places, were caught by the blacks, who kill them with a wooden missile called a waddy.

Amphibolurus pictus, *Peters.*

Three specimens; between Fraser Range and Southern Cross, and between Fraser Range and Victoria Springs.

Specimen A (total length)	...	...	170 mm.
Specimen B " "	...	...	150 "

Ground-colour of back reddish-brown; a light-coloured vertebral line from neck to root of tail; the back with black and whitish spots, which form alternate irregular cross bars; tail whitish with irregular broad transverse bands. Under-surface cream-coloured, specimen A having the median part of the throat and chest blackish; specimen B without any markings. Sp. A with an uninterrupted series of femoral pores, which are absent in sp. B.

The third specimen, viz., that from the country between Queen Victoria Spring and Fraser Range, greatly resembles sp. B in size and colour.

Amphibolurus reticulatus, *Gray.*

Four specimens; near Queen Victoria Spring.

General aspect, stout. Head very short. Nostril piercing the canthus rostralis and directed upwards; canthus rostralis blunt. A low nuchal crest indicated by about eight or nine large conical spines. The enlarged, flat, obtusely-keeled scales which are scattered over the back are whitish and arranged in groups, three or four scales generally forming the centre of a light brownish-coloured spot; these spots are enclosed by a blackish reticulation. The specimens agree in all essential details with the description of this species given by Boulenger, but differ in possessing a smaller number of præ-anal and femoral pores, and having the ventral scales feebly keeled.

Sp. A. Total length, 115 mm.; tail injured; number of pores not ascertainable on account of bad preservation.

Sp. B. Total length, 110 mm.; twenty præ-anal and femoral pores.

Sp. C. Total length, 138 mm.; twenty præ-anal and femoral pores.

Sp. D. Total length, 135 mm.; twenty-eight præ-anal and femoral pores.

The number of pores, as stated by Boulenger, in the British Museum specimens are from thirty-five to forty-five.

Amphibolurus Adelaidensis, *Gray*.

Two specimens. Between Queen Victoria Spring and Fraser Range.

Adult. –Olive-grey above, with a regular series of dark-brown angular spots on each side of the vertebral region and another series, more or less regular, along each side between fore- and hind-limb. Head rufous, with symmetrical dark markings; limbs with irregular cross bars; tail with two longitudinal series of black spots; under-surface light-coloured, conspicuously marbled with darker tints.

Young.—Pale olive-grey above, with the same darker markings as in the adult.

The following are the measurements of the larger specimen:—

Total length	120 mm.
Head	15 "
Body	35 "
Tail	70 "
Width of head	11 "
Length of forelimb	20 "
Length of hindlimb	30 "

Amphibolurus barbatus, *Curier*.

This common Australian lizard was collected at the following localities:—Between the Barrow and Everard Ranges; between Everard and Fraser Ranges; between Fraser Range and Southern Cross (Yilgarn); and near the Queen Victoria Springs.

Specimens from the last-named locality are the largest, measuring 300 mm. total length. The colouring is as follows.—Of a uniform dark olive above, the smaller specimens with an ochraceous-yellow band across the head between eye and ear; in one specimen the front of the head is yellow, tail with yellow cross-bars. Under-surface light-coloured; in some specimens the throat is black.

Tympanocryptis lineatus, *Peters*.

Farina. Three specimens.

Tympanocryptis cephalus, *Günther*.

Two specimens of similar size, from outward appearance male and female; from the Murchison District, in plain-country, consisting of reddish clay soil, with scattered fragments of ferrugineous sandstone.

Nostril much nearer the eye than the tip of the snout, upper head-scales large, not so strongly keeled as in *T. lineatus*: large flat tubercles on the occiput; dorsal scales rather feebly keeled; the larger ones mucronate and forming irregular transverse

series, these give the back a wrinkled appearance. Two præanal pores. Colour rusty-brown above, with several indistinct cross-bands, the one across the neck being darkest; sides of body blackish. Tail with dark broad bars.

The following measurements refer to both specimens : —

Total length	140 mm.
Head	18 "
Body	47 "
Tail	85 "
Width of head	16 "
Length of forelimb	29 "
Length of hindlimb	40 "

PHYSIGNATHUS LONGIROSTRIS, *Boulenger.*

One specimen, Murchison District.

Total length	351 mm.
Head	26 "
Body	60 "
Tail	265 "
Width of head	13 "
Length of forelimb	32 "
Length of hindlimb	70 "

Mr. Helms informs us that he had a second specimen, about thrice the size of the above, which perished from want of preserving material.

Mr. Boulenger records Nickol and Champion Bays, N.W. Australia, as the localities where the types in the British Mus. Coll. were found.

MOLOCH HORRIDUS, *Gray.*

This lizard was collected by the Expedition at the following localities : —

Arkaringa Creek (one).
Near Everard Range (one).
Near the Barrow Range (two).
A number of ova (laid in confinement) Fraser Range.

Family VARANIDÆ.

VARANUS GOULDII, *Gray.*

Two specimens; Fraser Range.

Dark brown above, with yellow annuli which form about fourteen rows across the back and sides of the body; yellow bars across limbs, toes and tail, those on the limbs interrupted; temple with two yellow streaks separated by a black band, these streaks extend distinctly along the sides of the neck. Lower surface yellowish, with small blackish spots. Throat with an angular

lambdoid blackish mark. Lower jaw light-coloured. The terminal third of the tail is light-coloured, without any markings.

The second specimen is smaller, and has rows of round yellow spots across the limbs. The length of the neck (13 cm.) given in Boulenger's description seems to be disproportionate to the length of the head (8 cm.). Possibly his measurements were taken from skins or mounted specimens, as we have found a similar discrepancy in our stuffed specimens as compared with those in a fresh state or preserved in spirits, of which we have measured a large number.

Total length	41·5	centim.
Head	5	"
Neck	5	"
Body	19	"
Tail	48	"
Length of forelimb	7·5	"
Length of hindlimb	12	"

Varanus punctatus, *Gray*.

One male specimen; Fraser Range.

The length of the neck nearly equal to the length of the head. A tuft of spines on each side of the base of the tail. Above, nearly black, with narrow yellowish reticulated lines on the trunk, which gradually disappear towards the neck, but these are most distinct towards the root of the tail. Limbs minutely punctated with yellow; root of tail with a few narrow yellowish annuli. Under-surface greyish, mottled with yellow and black. Throat, chest and under-surface of tail uniformly black.

Total length	71·5	centim.
Head	5	"
Neck	4·5	"
Body	18	"
Tail	44	"
Length of forelimb	7	"
Length of hindlimb	9·9	"

Family SCINCIDÆ.

Egernia Whitei, *Lacép.*

One specimen. Between Fraser Range and Queen Victoria Spring.

Above, olive-brown with two black dorsal bands, each of them with a series of small whitish spots; sides of body salmon-coloured. Under-surface pale, with olive tinge; throat partly bluish, with black markings. Total length, 200 mm.

Egernia Kintorei, *sp. nov.*

One very large specimen of this beautiful lizard is from the northern part of the Victoria Desert, south of Barrow Range a second small immature specimen from the Fraser Range and a third, also a young one, from between the Fraser Range and the Queen Victoria Spring.

A full description of this new species, which we have named in honour of His Excellency the Governor, the Earl of Kintore, will be given in a detailed report upon the zoological results of His Excellency's transcontinental journey, on which occasion it was first found by Dr. Stirling. Largest specimen :—

Total length	360 mm.
Head	35 "
Body	150 "
Tail	175 "
Width of head	30 "
Length of forelimb	55 "
Length of hindlimb	60 "

In the largest specimen the colour is a light reddish-brown above, with dark markings; under-surface bright lemon-coloured; but the latter tint has now faded from immersion in spirit. This specimen was found in the possession of a young black girl, who was left behind by the tribe on the approach of the Expedition. The two smaller specimens have a total length respectively of 145 and 160 mm.

Egernia depressa, *Günther.*

One male and two females of this apparently little-known lizard were obtained in the Murchison River District, having been found in hollow logs. One of the females contained a fully developed young of about 50 mm. total length in each oviduct. All these specimens accord with Boulenger's description. Colour olive-brown above, with irregular cross bands ; those on the neck are reddish-brown, on the tail black, edged with light yellow. Measurements of largest specimen :—

Total length	130 mm.
Head	23 "
Body	67 "
Tail	40 "
Width of head	17 "
Length of forelimb	25 "
Length of hindlimb	30 "

Egernia striolata, *Peters.*

Two specimens ; between Fraser Range and Southern Cross.

These agree in all essential respects with the description given in Boulenger's Catalogue.

The number of labials are respectively seven and eight in the two specimens; one has the fourth, the other the fifth right upper labial shield subdivided. Thirty-two scales round the middle of the body; dorsals largest, tri- or quadri-carinate (not quinquecarinate, as stated to be the case in the British Museum specimens). Total length, 170 mm. (the tail having been reproduced). Above, dark slate-coloured, with the neck rufous, tail olive. Some of the dorsal scales have a dark central spot. Under-surface salmon coloured, throat bluish.

Trachysaurus rugosus, *Gray*.

Four specimens; between Fraser Range and Hampton Plains. The largest specimen 340 mm., total length. Above jet-black, marked with a few bright sulphur-yellow and brick-red spots on the back and limbs. Head, with the exception of the parietals, bright brick-red. Under-surface black, with large yellow spots.

Tiliqua occipitalis, *Peters*.

Three specimens, Fraser Range; the largest 400 mm, total length.

Lygosoma Leæ, *Boul*.

One specimen from the Barrow Range. This differs somewhat from Boulenger's description, but from a single specimen, and in the absence of comparison with the type-specimen, we cannot positively state whether it is referable to this species or not. The differential characters are 24 scales round body, no præ-anal pores present, and instead of the six white longitudinal lines on the back in the British Museum type-specimen, our specimen has eight lines of a greenish tinge.

Total length	160 mm.
Head	15 "
Body	42 "
Tail	103 "
Width of head	8 "
Length of forelimb	16 "
Length of hindlimb	30 "

Lygosoma Fisheri, *Boul*.

Seven specimens; Barrow and Everard Ranges.

At the first glance these closely resemble the common variety of *Lygosoma Lesuerii*. The white edges of the black dorsal bands are wide, and the row of small light spots on each side of the dorsal line, which are usually present in *Lygosoma Fisheri*, are, in the above specimens, totally absent. Five upper anterior labials, the sixth being below the eye.

Two young ones, obtained between the Everard and Barrow

Ranges, have these spots fused, forming two additional pale narrow longitudinal lines on each side of the back.

Total length	200 mm.
Head	15 "
Body	62 "
Tail	123 "
Width of head	18 "
Length of forelimb	18 "
Length of hindlimb	33 "

Lygosoma monotropis, *Boul.*

One specimen; found in a dry well at Yardanie, between Fraser Range and Yilgarn.

Light-brown above, with nine dark brown, broad, transverse bands between the head and base of tail; the latter having nine bands, but the reproduced portion is not banded. The interparietal shield presents a very marked external indication of a pineal eye appearing as a white spot.

Total length	160 mm.
Head	23 "
Body	60 "
Tail	77 "
Width of head	12 "
Length of forelimb	23 "
Length of hindlimb	32 "

Lygosoma melanops, *spec. nov.* Pl. VI., figs. 3 and 3*a*.

Two specimens; between the Everard and Barrow Ranges.

This species is closely allied to *Lygosoma branchiale*, with which it agrees in many respects, but the distance between the end of the snout and the forelimb is contained nearly twice and a-half times in the distance between the axilla and groin instead of once and three-fourths to twice as in *L. branchiale*. Body much elongate. The three large vertical spots on each side of the neck in *L. branchiale* are absent.

Colour.—Olive above; rows of black dots descend from the sides of the head to the throat; alternate scales of the trunk marked with a black spot or short streak; on the neck-scales the spots are absent, on the tail they are sometimes double. Under-surface pale straw-coloured, with the scales similarly spotted.

Young, like the adult, but every third or fourth shield having a large white spot. Face, upper and lower lips blackish, but not so dark as in the adult.

Total length	...	...	...	...	153 mm.
Head	...	...	...	...	17 "
Body	...	...	...	...	70 "
Tail	...	...	...	...	66 "
Width of head	...	...	...	...	10 "
Length of forelimb		...	...	...	16 "
Length of hindlimb		...	...	...	20 "

Lygosoma fragile, *Günther.*

Two specimens; between the Everard and Barrow Ranges.

In the following notes we repeat Boulenger's description, which agrees accurately with the above specimens:—

Body much elongate; limbs very weak, tridactyle. Scaling as in *L. Bougainvillei*, except that the fronto-parietals are united into a single shield, and the fourth labial enters the orbit. Ear just distinguishable. Twenty scales round the body. Hind-limb as long as the distance between the eye and forelimb. Toes very unequal in size, the third longest.

Colour.—Olive above, with indistinct black lines along the series of scales; sides blackish, this colour being sharply defined towards the back; belly sparingly spotted with black.

The following are the measurements of one specimen:—

Total length	...	...	...	...	74 mm.
Head	...	...	...	...	6 "
Body	...	...	...	...	33 "
Tail	...	...	...	...	35 "
Width of head	...	...	...	...	4 "
Length of forelimb		...	...	...	4 "
Length of hindlimb		...	...	...	9 "

Lygosoma Gerrardii, *Günther.*

One specimen; Fraser Range.

Colour.—Light-grey above, with four narrow dark-brown longitudinal lines. Lateral lines broad, and of the same colour; lower surface yellowish.

Total length, 150 mm.

A species of Lygosoma, represented by three specimens, collected in the Barrow Range, agrees in every respect with *L. Gerrardii*, except that the forelimbs are didactyle, and the hindlimbs tridactyle. There are, in the S.A. Museum, several lizards which we refer to *L. Gerrardii*, with the forelimbs rudimentary or altogether invisible externally. We come therefore to the conclusion that the number of toes in this group, which formerly formed the genus *Rhodona*, are subject to great variation. Boulenger stated, in describing this species, that the forelimbs are either mono- or di-dactyle.

Lygosoma bipes, *Fisher.*

A single specimen of this little lizard, which appears to be scarce in collections, was obtained in the Barrow Range. It agrees exactly with the description in the "British Museum Catalogue."

Total length	97 mm.
Head	5 "
Body	47 "
Tail	45 "
Width of head	3 "
Length of hindlimb	10 "

Ablephorus Greyi, *Gray.*

A single specimen ; near Camp 9 (Everard Range).

Order Ophidia.

Typhlops sp.—A small specimen of a species of *Typhlops* was collected in the Fraser Ranges, the specific name of which we are not yet in a position to determine.

Pseudechys australis.

Between the Fraser Range and Yilgarn ; two skins in spirit, each about six feet long.

Vermicella fasciata, *spec. nov.* Pl. VI., figs. 4 and 4*a*.

Near the Barrow Range ; one specimen.

Scales in seventeen rows ; abdominal plates 145–146 ; two anal plates ; subcaudal plates in two rows of twenty-seven each. Body of moderate length (12·5 inch), nearly cylindrical ; the tail short ($1\frac{1}{3}$ inch), terminating in a blunt conical scale. Head very short (0·30 inch long), not distinct from trunk. Rostral shield large, obtusely angular posteriorly ; nostrils elongate, piercing the middle of a rhomboidal nasal shield. Anterior frontals quadrangular, forming sutures with the nasals on the outer margin ; posterior frontals hexagonal, also forming sutures with the nasals as well as with the second and third labial shields ; vertical shield hexagonal, nearly as broad as long, very obtusely angular anteriorly and nearly rectangular posteriorly. Supra-oculars large, pentagonal anteriorly ; one anterior and two posterior oculars. Occipital shields large, pentagonal or hexagonal, broader in front than behind. Three temporal shields, of which the first is the largest and is in contact with the posterior oculars, and also with the fifth and sixth labials. Six upper labials, the third and fourth reaching the margin of the eye, the last the largest. Seven lower labials, the first elongate and forming a long suture behind the triangular mental shield ; the second small, and the fourth the largest.

Colour.—Head cream-coloured ; rostral, anterior and posterior frontals marked with black on their posterior margin. Upper lip-shields similarly marked on their superior margin ; all the remaining shields of the upper surface of head black. Upper surface very conspicuously marked with 53 black transverse bands, which comprise one row of scales and occupy about one-half the circumference of the body. The spaces between these bands occupy two transverse rows of scales, and present a distinctly orange tinge from the fact that each scale, cream-coloured at its base, is tipped with the former colour. The scales of the the black bands have a pale spot or streak in the centre for the posterior three-quarters of the body. Under-surface uniformly cream-coloured.

This very distinct species resembles *V. Bertholdi* in external appearance, but is proportionally much more elongate, and the black freckles on the head, which are characteristic for the latter species are totally absent in *V. fasciata*. A second specimen in the South Australian Museum conforms to the above description, but the markings have become faded from exposure to light. It was collected in the Western plains.

AMPHIBIA.

Order Batrachia.

Family BUFONIDÆ.

Pseudophryne australis, *Günther*.

Found about forty miles N.W. of the Fraser Range in a rock-hole filled up with silt ; seven specimens.

These specimens closely resemble the above-named species, but show slight differences in respect of having the metatarsal tubercles much larger, and a greater predominance of light-colour on the under-surface.

DESCRIPTIONS OF PLATES.

Plates VI.

Fig. 1. Diplodactylus Elderi. *Nat. size.*
" 1*a*. " " Scales of back ; *enlarged.*
" 2. Amphibolurus rufescens. Upper surface of body ; *nat. size.*
" 2*a*. " " Dorsal scales ; *enlarged.*
" 3. Lygosoma melanops. *Nat. size.*
" 3*a*. " " Head shields ; *nat. size.*
" 4. Vermicella fasciata. *Nat. size.*
" 4*a*. " " Head shields ; *nat. size.*

Plate VII.

Amphibolurus scutulatus. Fig. 1. Male. Fig. 2. Female.

COLEOPTERA

(Continued).

By REV. T. BLACKBURN, B.A.,

Hon. Curator for Entomology, S. Aust. Mus.

In the former part of this memoir I furnished a catalogue in systematic order of the *Coleoptera* of the Elder Expedition down to the Tribe *Leptopsini* of the Family *Curculionidæ*, one tribe, however, of the *Carabidæ* (the *Broscides)* being omitted, owing to my having asked Mr. T. G. Sloane, of the Linnean Society of N.S. Wales, to deal with it. Mr. Sloane has made a special study of that tribe, and has published some valuable memoirs relating to it, so that it is a matter for congratulation that the Royal Society has been able to enjoy the benefit of his assistance. His contribution on the *Broscides* will be found in the present issue. I now propose to continue and complete the catalogue of the *Coleoptera* of the Expedition, taking up the work at the place where the former part ended. The first of the remaining tribes of *Curculionidæ* (the *Amycterini)* is, however, another group of which Mr. Sloane has made a special study, and that gentleman has been good enough to take them in hand, his memoir relating to them finding a place in this issue.

The first species enumerated in the following catalogue *(Ecaniocera minuta)* belongs, it will be observed, to a family (the *Rhipidophoridæ)* whose proper place is in the part issued last December. Its omission was due to the specimen having been so clogged with gum that its characters were not visible, and I accidentally passed it over, under the impression that it was a Phytophagous insect, but as soon as I had cleaned it for examination its real place was of course apparent.

It will be noticed that I have introduced in the catalogue of species obtained by the Elder Expedition descriptions of several species in my own collection. These are insects allied to some of those of the Expedition, and inhabiting localities (such as the McDonnell Ranges, the basin of Lake Eyre, the Eyre-Peninsula) that may be regarded as outlying parts of the geographical region through which the expedition travelled. It seems convenient that their descriptions should appear in company with those of their allies which fell into the hands of Mr. Helms. The interpolated species are indicated by an asterisk prefixed to the name.

RHIPIDOPHORIDÆ.

EVANIOCERA.

E. minuta, sp, nov. Sat nitida; picea, tibiis paullo dilutioribus, elytris pallide marginatis; pubescens; capite prothoraceque sat fortiter granulatis; hoc a basi ad apicem angustato, lateribus fere rectis, angulis posticis extrorsum (nullo modo retrorsum) directis, basi media sat fortiter lobata; scutello oblongo-quadrato, postice rotundato; elytris minus fortiter granuloso-punctulatis, oblique obsolete striatis. Long., $1\frac{4}{5}$ l.; lat., $\frac{4}{5}$ l.

Maris antennarum articulo 3° quam 2us duplo longiori et ramum quam sequentium parum breviorem emittenti.

At once distinguishable from the previously described Australian species of this genus by its extremely small size.

Everard Range.

CURCULIONIDÆ (continued).

Cylindrorhinini.

PANTOPŒUS.

An immature and somewhat crushed specimen seems to appertain to this genus, but its condition forbids its specific determination. It was found about the Barrow Range.

Gonipterini.

OXYOPS.

O. pruinosus, Pasc? Mr. Pascoe's description is too brief to allow of positive identification, but the example before me seems likely to be the insect to which this name was given, at any rate it is very near it.

Mount Squires.

O. floreus, Pasc? A similar difficulty forbids my feeling certain that this identification is correct.

Fraser Range.

SYARBIS.

S. gonipteroides, Pascoe. Mount Squires.
S. sciurus, Pascoe. Mount Squires.

Aterpini.

APARETE.

In dealing with genera characterised by Mr. Pascoe, the precaution generally seems necessary of qualifying one's reference to them of new species. In the present case *Aparete* seems to me very much over characterised, even the relative length of the joints of the funiculus being treated as generic. In this and

other minutiæ the following species does not agree with the diagnosis, but it presents the following characters, which I take to be the essential features distinguishing *Aparete* from the other *Aterpid* genera :—Ocular lobes wanting; body not cylindric; scrobes terminal or nearly so; club of antennæ closely united to the funiculus; tarsi having their penultimate joint entire.

A. nodosa, sp. nov. Sat convexa; fusco-cinerea, squamis crassis (setulisque brevibus) cinereis vestita; rostro sat brevi supra longitudinaliter concavo; capite utrinque supra oculos cristato; prothorace quam latiori sublongiori, pone apicem subfoveatim depresso, vermiculato-ruguloso, postice subtruncato, antice paullo angustato in medio sat producto, lateribus sat rotundatis; elytris punctulato striatis, interstitiis convexis, interstitiis 3° 5° que pone medium (hoc 3— illo 2—) 7° ad humerum (hoc 1—) tuberculatis; corpore subtus sparsim fortiter punctulato. Long., $3\frac{1}{5}$—$4\frac{1}{2}$ l.; lat., $1\frac{3}{5}$ -2 l.

The basal two joints of the antennal funicle are elongate, the rest transverse or nearly so, the seventh being considerably enlarged and somewhat confused with the club. The metasternum is a little shorter than in *Ethemaia sellata*, Pasc. This species differs *inter alia* from *A. palpebrosa*, Pasc., by the second joint of its funicle not transverse.

Nilpena, and to the west of that place; also Cootinoorina.

HYPHÆRIA.

This genus is very briefly characterised by its author (Mr. Pascoe), who says that the characters are as in *Ethemaia*, but the third tarsal joint not bilobed. The following species do not appear to differ from *Ethemaia*, except by the character specified.

**H. beltanensis*, sp. nov. Minus convexa; nigra vel fusca, setis brevibus squamisque adpressis colore variis (fuscis nigris et albidis) vestita; rostro sat brevi supra longitudinaliter concavo, utrinque cristis 2 instructo; capite utrinque supra oculos cristato; prothorace vix quam latiori longiori, antice leviter angustato, late leviter canaliculato, coriaceo, valde inæquali, margine antico antrorsum postico retrorsum convexis, lateribus leviter arcuatis; elytris confertim subtiliter punctulatis, leviter striatis (striis puncturis magnis seriatis instructis), interstitiis minus (alternis paullo magis) convexis; interstitio 3° tuberculo magno, 5° tuberculis 3, postice ornatis; corpore subtus confertim rugulose reticulato-punctulato. Long., 3—$3\frac{4}{5}$ l.; lat., $1\frac{2}{5}$—$1\frac{3}{5}$ l.

This is an extremely difficult species to describe satisfactorily; probably it may be best distinguished by its generic characters

and its remarkable head and rostrum. These latter form together an uninterrupted longitudinally concave surface, with a very large crest over each eye, a smaller one on each side of the rostrum near its base, and a still smaller one on each side near the apex of the rostrum. Most of the specimens I have seen are covered with a brown indumentum, which completely hides all the sculpture except the crests of the head and rostrum and the tubercles near the apex of the elytra; also the whole sculpture of the under surface. I have described the sculpture from an example from which I have with much difficulty removed the indumentum. The only specimen I have seen without the indumentum is a decidedly pretty insect, closely covered with scales and setæ, which almost conceal the sculpture. In that example the crests of the head and rostrum are tipped with bright brown setæ, the prothorax is traversed longitudinally by four ribs of brown scales and is variegated with whitish scales on the sides, the interstices of the elytra form alternate brown and blackish vittæ, and patches of whitish scales are distributed over the elytra, the most conspicuous being a spot running obliquely hindward towards the suture from the anterior part of the seventh interstice. The legs are thickly clothed with brown scales and hairs.

S. Australia; near Beltana.

**H. parallela*, sp. nov. Elongata; parallela; fusca, squamis setisque fuscis cinereisque intermixtis vestita; rostro minus brevi longitudinaliter concavo, capite utrinque supra oculos obsolete cristato; prothorace cylindrico quam latiori sat longiori, grosse ruguloso-punctulato; elytris punctulato-striatis, interstitiis alternis convexis (3° toto et 5° postice tuberculis remotis ornatis, tuberculis discoidalibus nigris). Long., $2\frac{2}{3}$ l.; lat., $\frac{7}{10}$ l.

This species must be referred to *Hypharia*, as I can find no structural character to distinguish it from *Ethemaia*, except that the third joint of its tarsi is not bilobed. It is very distinct from all its previously-described allies by its very narrow and parallel almost linear form. The crest on either side of the head is very feeble. The antennæ are short, not reaching back much behind the front of the prothorax; the basal joint of the funiculus is not much longer than wide, and is much thicker than the following joints, which are moniliform and clothed with fine hairs. The prothorax is almost perfectly cylindric, its front margin a little elevated; the ashy scales on its surface are sprinkled over the surface, but are condensed to form three vittæ. The prevalent scales on the elytra are the cinereous ones; a small black tubercle on the third interstice in front of the middle is accompanied by a similar elevation close to it on the

fourth interstice slightly nearer the front, and the black colour runs across the stria so that there is an appearance of a small obliquely-elongate black patch ; the third interstice bears another small black tubercle or crest a little behind the middle, and another at the posterior declivity and two very small ones near the apex. The hinder part of the fifth interstice bears some obscure tubercles.

Central Australia ; McDonnell Range.

**H. variabilis*, sp. nov. Minus elongata ; fusca vel nigra, squamis setisque nigris fuscisque intermixtis · vestita ; *H. parallela* affinis ; differt forma multo minus gracili minus parallela, prothorace minus elongato ad latera magis rotundato, elytris haud ante medium tuberculatis. Long., $2\frac{1}{5}$—$3\frac{1}{5}$ l. ; lat., $\frac{1}{5}$—$1\frac{1}{5}$ l.

This is a most variable insect, and extremely difficult to characterise satisfactorily owing to most specimens being more or less clothed with an indumentum, which conceals the characters. A fresh specimen is clothed with dull-brown scales, with usually some indication on the prothorax of vittæ formed by paler scales ; on the elytra there are usually patches of black scales, which vary in extent up to almost covering the surface. The alternate interstices are convex, and the tubercles are confined to the posterior declivity, commencing, however, slightly in front of it ; the third and fifth interstices each bear two well-defined tubercles, and there are a few more or less defined granule-like tubercles.

S. Australia ; basin of Lake Eyre.

Belini.

Belus.

B. angustulus, Germar. Fraser Range.

B. sparsus, Germar. Fraser Range.

B. difficilis, sp. nov. Angustus, sublinearis ; piceus, squamis albidis ornatus, prothorace antice elytris pedibusque rufescentibus ; rostro validocylindrico arcuato quam prothorax subbreviori nitido subtilissime punctulato ; capite prothoraceque confertim granulatis ; antennarum articulis 3° 4° que longitudine inter se æqualibus ; prothorace quam latiori vix longiori, vix canaliculato, in medio longitudinaliter albido-squamoso, lateribus leviter arcuatis antice subcoarctatis, basi bisinuata ; elytris confertim sat subtiliter punctulatis suturam versus maculatim albido squamosis, ad apicem singulatim acuminatis vix productis, juxta scutellum subelevatis ; abdomine in medio sparsim, ad latera dense albo-hirto ; femoribus

anticis muticis fortiter incrassatis, posticis segmenti ventralis basalis apicem haud attingentibus. Long (rostr. incl.), 5 l.; lat., 1 l.

Closely allied to *B. angustulus*, Germ., and *filiformis*, Germ., differing from the former *inter alia* by its shorter and stouter rostrum, its more linear form and the much less produced apices of its elytra; from the latter *inter alia* by its elytra distinctly mottled with whitish scales near the suture, its less elongate form and the more produced apices of its elytra.

Fraser Range.

B. Helmsi, sp. nov. (fem.). Minus angustus; niger, squamis niveis ornatus, rostro antice et antennarum basi summa paullo rufescentibus; rostro cylindrico leviter arcuato quam prothorax paullo longiori, nitido, sat crebre a basi antrorsum gradatim magis subtiliter punctulato; capite mox intra oculos niveo-squamoso, sat crasse punctulato-granuloso; prothorace valde crasse nec crebre ruguloso-granulato (magis crasse minus crebre quam *B. bidentati*, Don.), quam longiori sat latiori, in medio canaliculato, niveo-trivittato, lateribus fortiter rotundatis, latitudine majori pone medium posita, basi media fortiter lobata; elytris ad basin fortiter (quam *B. bidentati* multo magis fortiter) singulatim lobatis, ad apicem singulatim acuminato-productis (quam *B. hemisticti*, Germ., paullo minus fortiter), antice fortiter granulosis postice fortiter vix crebre (quam *B. hemisticti*, Germ., paullo minus crasse minus crebre) punctulatis, longitudinaliter leviter bisulcatis (parte intermedia leviter convexis), maculatim niveo-squamosis, maculis antice confusis postice subtriseriatim ordinatis; abdomine ad latera dense, in medio confuse maculatim niveo-hirto; femoribus anticis muticis posticis segmenti ventralis secundi partem mediam attingentibus. Long. (rostr. incl.), 7 l.; lat., $1\frac{2}{5}$ l.

Allied to *B. semipunctatus*, Fab., and *hemistictus*, Germ., differing from both *inter alia* by its mutic femora, and the absence of any trace of an elytral carina; also near *B. amplicollis*, Jekel, but differing by its black antennæ and tibiæ; also (perhaps) near *B. anguineus*, Pasc. (which is insufficiently described), but differing from the description by its decidedly transverse prothorax. The elytra are not at all elevated at the base of the scutellum. The third joint of the antennæ is distinctly longer than the fourth.

Fraser Range.

B. ventralis, sp. nov. Elongatus, sat angustatus, sat parallelus; niger, squamis niveis ornatus, pedibus elytrisque nonnihil rufescentibus; rostro cylindrico leviter arcuato quam pro-

thorax sat longiori subtiliter sat crebre punctulato; capite inter oculos trivittatim niveo-squamoso, granuloso; prothorace sat fortiter nec crebre (quam *B. bidentati* manifeste minus crebre) granuloso, quam latiori fere longiori, in medio leviter canaliculato et interrupte niveo-squamoso, in disco utrinque maculis nonnullis niveis ornato, lateribus leviter arcuatis, basi fortiter bisinuata; elytris ad basin sat fortiter (fere ut *B. bidentati*, Don.) singulatim lobatis, ad apicem singulatim acuminato-productis (quam *B. hemisticti*, Germ., vix minus fortiter), sat fortiter sat crebre (fere ut *B. scalaris*, Germ.) granuloso-punctulatis, fere ut præcedentis *(B. Helmsi)* squamis niveis ornatis; abdomine ad latera dense niveo-hirto in segmentorum singulorum medio maculis singulis trifidis (ut *B. scalaris*, Germ.) niveo-hirtis ornato, femoribus anticis muticis, posticis segmenti ventralis basalis apicem vix attingentibus. Long., 8 l.; lat., $1\frac{3}{10}$ l.

Very close to *B. scalaris*, Germ., but certainly not, I think, a *mere* variety. It differs in the much more nitid and less conspicuously punctulate rostrum, in the prothorax longer and less rounded laterally (in the same sex), and especially in the white pilosity on the elytra not being confined to the sutural region, but forming three rows of spots on each elytron, with other spots added in the basal part. If it should prove to be a variety of *scalaris* the very different markings of the elytra would justify its being a *named* variety. It is not quite so narrow and elongate as *B. scalaris*.

Fraser Range.

B. frater, sp. nov. Sat elongatus; sat angustus; niger, squamis niveis ornatus, rostro elytris pedibusque plus minusve rufescentibus; rostro cylindrico leviter arcuato quam prothorax paullo longiori, subtiliter (maris) vel subtilissime (feminæ) punctulato; capite mox intra oculos niveo-squamoso, ut prothorax crebre nec crasse granuloso; prothorax leviter transverso, sat late canaliculato (canali dense niveo-squamoso), lateribus postice sat rotundatis, basi fortiter bisinuata; elytris ut præcedentis *(B. ventralis)* sed pone scutellum leviter gibbosis, plus minusve (omnium exemplorum sutura dense) crebre maculis niveis squamosis ornatis; abdomen fere ut *B. ventralis;* femoribus anticis subtus ante apicem bidentatis, posticis segmenti ventralis basalis apicem vix attingentibus. Long. (rost. incl.), 6—8 l.; lat., 1—$1\frac{2}{5}$ l.

In the male the rostrum is more strongly punctured than in the female, and the anterior femora are much less incrassate. This species is so close to the preceding that if I had not seen both sexes of it I should have hesitated to distinguish it specific-

ally. It, however, differs in its femora dentate beneath, its more slender rostrum, its prothorax wider with more rounded sides and closer sculpture , its elytra slightly protuberant behind the scutellum, its less linear form, and its abdomen with the pilosity of the middle part (though forming a similar pattern) much less dense and conspicuous (this is not owing to abrasion). The fourth joint of the antennæ is scarcely longer than the third. In some examples the pilosity along the suture scarcely consists of spots, but is continuous.

Fraser Range.

**B. bison*, sp. nov. *B. Helmsi* affinis; rostri apice et antennarum basi haud rufescentibus; capite prothoraceque sat crebre vix crasse (fere ut *B. bidentati*, Don.) granulosis; prothoracis canali vix perspicue niveo squamoso; elytris pone scutellum fortiter abrupte elevatis, ad basin quam *B. Helmsi* minus (quam *B. bidentati* magis) fortiter lobatis, postice quam *B. hemisticti*, Germ., vix minus crebre punctulatis, sulco exteriore vix manifesto; femoribus posticis segmenti ventralis basalis apicem parum superantibus; metasterni episternis macula magna denudata instructis; cetera ut *B. Helmsi*. Long. (rostr. incl.), $6\frac{1}{2}$ – $7\frac{1}{3}$ l.; lat., $1\frac{2}{3}$ – $1\frac{1}{3}$ l.

This species is remarkably like *B. Helmsi*, but is at once distinguishable from it by the strongly-defined hump behind its scutellum, by the notably closer and less-coarse sculpture of its head and prothorax, by its prothoracic channel almost devoid of pilosity (apparently not the result of abrasion), by the very evidently closer puncturation of its elytra, by the longitudinal concave spaces on the elytra being very feeble (the outer one scarcely traceable), by the third joint of the antennæ being not at all longer than the fourth, by the presence of a large round denuded spot on the episterna of the metasternum that part being in *B. Helmsi* (as in most *Beli*) covered uniformly with the pilosity of the lateral stripe- -and by its shorter hind femora.

The male is a little smaller and narrower than the female, its rostrum scarcely different from that of the female, its elytra a little less produced posteriorly, and (as usual in the genus) its anterior femora much less incrassate.

Interior of S. Australia; basin of Lake Eyre; in my collection

**B. perplexus*, sp. nov. (Mas.) *B. Helmsi* affinis; rostri apice vix antennarum basi nullo modo rufescentibus; prothorace magis crebre minus crasse (fere ut *B. bidentati*, Don.) rugu loso-granuloso, canali vix perspicue niveo squamoso, lateribus ab apice fere ad basin subrecte divergentibus (ut *B. bidentati*, Don. maris), basi media minus fortiter lobata; elytris ad basin minus fortiter (quam *B. bidentati* manifeste minus

fortiter) lobatis, distincte tricarinatis, carinis antice et postice obsoletis. Long. (rostr. incl.), 6 l. ; lat., $1\frac{3}{10}$ l.

Sterni episternis maculis denudatis binis ornatis, cetera ut *B. Helmsi.*

This insect is extremely close to *B. Helmsi* and *B. bison*, but is certainly a good species. From *B. Helmsi* it is at once distinguishable by the base of the elytra being very much less strongly lobed forward and the third and fourth joints of its antennæ being equal or nearly so ; from *bison* by the absence of any elytral protuberance behind the scutellum, and from both by the three well defined carinæ on each of its elytra. These carinæ terminate at the point where the elytra begin to narrow to the apex ; that nearest the suture begins at a distance from the base about equal to a quarter of the length of the elytra, and the others at successively increasing distances from the base ; the intervals between them are not distinctly concave, but there is a wide flat space on either side of the suture limited by the first of the carinæ. The innermost carina on each elytron is almost exactly like the corresponding carina on the elytra of *B. bidentatus*, but is more distant from the suture. The prothorax of almost exactly the same shape (but a little less transverse), at any rate in the male, as that of *B. bidentatus* is a good character.

I have examples from Western Australia of a *Belus* which I cannot separate from this by any definite character, although it has a very different appearance owing to the squamosity of its surface being grey rather than white, and being very much more plentiful, almost covering the surface.

Interior of S. Australia ; basin of Lake Eyre.

**B. Flindersi*, sp. nov. (Mas.) *B. Helmsi* affinis ; piceo-niger, rostro antennis pedibusque paullo rufescentibus : prothorace minus crasse magis concinne granulato (fere ut *B. scalaris*, Germ., sed granulis nonnihil majoribus), quam longiori fere tertia parte latiori, canali mediano albo-squamoso nisi ad basin carente, basi media minus fortiter lobata ; elytris ad basin paullo minus fortiter lobatis, antice magis crebre magis subtiliter granulosis postice magis crebre punctulatis ; abdomine toto et metasterno maculis denudatis ornatis nec ad latera vitta pilosa continua instructis ; femoribus anticis dentibus binis parvis armatis, posticis segmenti ventralis basalis apicem vix superantibus ; cetera ut *B. Helmsi.* Long. (rostr. incl.), $6\frac{1}{2}$ l.; lat., $1\frac{2}{3}$ l.

The greatest width is immediately behind the base of the elytra, whence the outline is slightly incurved, the width near the apex being not much less than in front ; in the species of *Belus* having an outline of this kind the posterior dilatation is

usually greater than that behind the base. The typical example is distinguished from its nearest allies by the distinctly reddish tone of the elytra and legs, and by the paucity of its whitish scales, which form small spots placed at long intervals along the suture, and a few not very conspicuous spots sparsely sprinkled over the rest of the surface; but it is quite possible that these characters of colour and vestiture are not constant. The whole of the under-surface being mottled with denuded spots, so that there is no continuous white stripe, is likely to be a reliable character. The third and fourth joints of the antennæ are almost equal in length.

South Australia; Eyre's Peninsula.

**B. mundus*, sp. nov. Sat angustus; parallelus; piceo-niger, squamis niveis ornatus, antennis pedibusque paullo rufescentibus; rostro cylindrico quam prothorax vix longiori, pone antennarum basin ut capite prothoraceque opaco sat crebre granuloso-ruguloso, antice nitido fere lævigato; antennis sat brevibus, articulis 3° 4° que longitudine inter se sat æqualibus; capite mox intra oculos niveo-squamoso; prothorace leviter transverso, canaliculato, canali niveo-squamoso; lateribus a basi fere ad apicem fortiter rotundatis, basi fortiter bisinuata; elytris ad basin sat fortiter (fere ut *B. scalaris*, Germ.) lobatis, ad apicem singulatim rotundatis haud productis, sat crebre (quam *B. scalaris*, paullo minus fortiter) rugulosis, maculatim niveo-squamosis, maculis juxta suturam majoribus magis crebris; corpore subtus ad latera dense in parte mediana minus dense niveo-piloso, hac maculatim subdenudata; femoribus anticis subtus sat fortiter bidentatis, posticis segmenti ventralis basalis apicem vix superantibus. Long. (rostr. incl.), $5\frac{1}{5}$ l.; lat., 1 l.

This is a very cylindric and parallel species, but not extremely slender or narrow, its shape being very much as in *B. scalaris*, Germ., albeit not quite so elongate. Its elytra scarcely at all produced (much less than in *B. scalaris*, though evidently more so than in *B. brunneus*, Guér.) at the apex, together with the presence of strong teeth beneath each of its front femora, associates it with a small group of species from all of which it is very distinct—by the following among other characters:—from *B. aphthosus*, Pasc., by its transverse prothorax, from *brunneus* by the character already mentioned, from *serpens*, Pasc., by there being two teeth (not only one) beneath its front femora. One or two others of Mr. Pascoe's briefly-described species may possibly belong to the same group, as their author does not say whether the femora are dentate, but even in that case they evidently (judging from description) differ in respect of other characters.

I think the example before me is a female, but do not feel quite sure, as the front femora are more incrassate than in the males of most species, but rather slightly so for a female ; the sculpture of the rostrum is suggestive of the male.

Interior of S. Australia ; Mermmerna.

**B. abdominalis*, sp. nov. Angustus ; parallelus ; rufo-piceus squamis niveis ornatus, pedibus dilutioribus ; rostro cylindrico quam prothorax vix longiori, sat nitido, sat subtiliter punctulato (maris postice magis fortiter); antennarum articulis 3° 4° que longitudine inter se sat æqualibus; capite sparsim niveo-squamoso, granuloso-punctulato ; prothorace quam longiori vix latiori, sat crebre (fere ut *B. scalaris*, Germ.), granuloso, leviter canaliculato, canali niveo-squamoso, lateribus a basi fere ad apicem sat rotundatis, basi fortiter bisinuata ; elytris ad basin modice (paullo minus fortiter quam *B. scalaris)* lobatis, ad apicem singulatim acuminatis vix productis, sat fortiter (fere ut *B. scalaris)* punctulato-rugulosis, sparsim maculatim niveo-squamosis (præsertim juxta suturam); corpore subtus æqualiter niveo-piloso, maculis rotundatis denudatis ornatis, his in metasterno biseriatim in abdomine triseriatim longitudinaliter dispositis ; femoribus anticis muticis, posticis segmenti ventralis basalis apicem nullo modo attingentibus. Long. (rostr. incl.), $4\frac{1}{2}$—$5\frac{1}{2}$ l.; lat., $\frac{3}{5}$—$\frac{9}{10}$ l.

A very narrow elongate species, perhaps closely allied to the very insufficiently described *B. farinarius*, Pasc., and *B. vetustus*, Pasc., but I do not think it can be identical with either of them, as Mr. Pascoe calls the latter "modice elongatus," and says of the former that it is "shorter than *B. vetustus*," the present species being a *very* elongate one, even more so than *B. filiformis*, Germar. Mr. Pascoe gives no information as to whether the femora of those two species are dentate beneath. He describes the abdomen of *B. farinarius* as having "four denuded spots on each side" which does not fit the present insect, it having in addition four round denuded spots along the middle line. This pattern on the ventral segments, each of the first four segments having a transverse row of three sharply defined round denuded spots, distinguishes the present species from all its near allies.

W. Australia ; taken by E. Meyrick, Esq.

**B. elegans*, sp. nov. Sat angustus ; parallelus ; piceus, squamis cinereis ornatus, rostri apice rufo ; rostro cylindrico arcuato quam prothorax manifeste longiori, sat nitido, subtilissime punctulato ; antennarum articulo 3° quam 4us sublongiori ; capite sparsim subtiliter granuloso, inter oculos sparsim cinereo-squamoso , prothorace quam latiori vix longiori, sat

-parsim granuloso (fere ut *B. scalaris*, Germ.), sat fortiter canaliculato, canali cinereo-squamoso, lateribus a basi fere ad apicem leviter arcuatis, basi fortiter bisinuata ; elytris ad basin modice (fere ut *B. scalaris*) lobatis, ad apicem singulatim acuminatis vix productis, sat crebre granuloso-rugulosis (haud distincte punctulatis), sat aequaliter (ad suturam haud magis quam in partibus ceteris) cinereo-maculatis, maculis inaequalibus nonnullis parvis nonnullis magnis intermixtis ; corpore subtus sat dense cinereo-maculatis, abdominis segmentis 1-4 utrinque macula rotunda denudata ornatis ; femoribus anticis subtus bidentatis, posticis segmenti ventralis basalis apicem vix superantibus. Long. (rostr. incl.), $4\frac{3}{5}$ l. ; lat., 1 l. (vix).

A very distinct species, owing to the large and small cinereous patches on the elytra not being especially connected with the suture ; the larger spots run more or less in two longitudinal rows on each elytron, of which the external one is scarcely less conspicuous than that nearer the suture. The general form is much as in *B. scalaris*, but less elongate, and with the elytra slightly more evidently at their widest behind the middle. This species is perhaps near *B. aphthosus*, Pasc., which, however, is so slightly described that it is difficult to form a clear idea of what it is like. It would seem, however, that it has a single tooth beneath all the femora, and that there are no denuded spots on its abdomen, both which characters furnish distinctions from the present insect.

S. Australia ; I am not sure of the exact habitat, but it is probably in the Northern interior.

**B. regalis*, sp. nov. Sat elongatus : minus parallelus ; piceo-niger, squamis cinereis et nonnullis flavescentibus vittatim ornatus, elytris pedibusque (nonnullorum exemplorum) plus minusve rufescentibus ; rostro quam prothorax longiori, arcuato, nitido, subtilissime punctulato (maris basin versus paullo magis fortiter) ; capite mox intra oculos flavescenti squamoso, rugulose punctulato ; prothorax quam longiori sexta parte latiori, sat fortiter (fere ut *B. bidentati*, Don.) granuloso, cinereo 3-vittato, sat fortiter canaliculato, lateribus ab apice fere ad basin rotundatum divergentibus (fere ut *B. bidentati*), basi bisinuata ; elytris ad basin modice lobatis, ad apicem sat fortiter acuminato productis, pone scutellum sat fortiter callosis, crebrius granulosis vel granuloso punctulatis (fere ut *B. suturalis*, Boisd.), vittis 2 (scil. subsuturali cinerea et sublaterali flavescenti) squamosis ornatis ; corpore subtus ad latera et in medio dense in ceteris partibus crebre maculatim niveo-squamoso ; femoribus anticis

subtus minute bidentatis, posticis segmenti secundi ventralis partem median attigentibus. Long. (rostr. incl.), $7\frac{1}{2}$—$9\frac{1}{4}$ l.; lat., $1\frac{3}{10}$—$1\frac{3}{5}$ l.

A large and handsome species, at once distinguishable by the unusual markings of its elytra, which consist of a continuous ashy-white vitta on either side of the suture extending from the base to the apex, and a yellow vitta (abbreviated near the base and apex) not far from the lateral margin. These vittæ appear to be sprinkled with minute dark spots owing to the granules of the elytra protruding through them. In form and sculpture this species is extremely close to *B. suturalis*, Boisd., but it differs totally in colour and markings, and also in the presence of a well-defined hump behind the scutellum. It also probably resembles *B. subparallelus*, Jekel (which I have not to my knowledge seen), but is evidently distinct from it, as *inter alia* that species is described as "supra violaceo-niger, antennis rufis," and the narrowness of its prothorax (which is even called "subcylindrico-conic") is particularly mentioned, none of which expressions fit the present insect. The third and fourth joints of the antennæ are of about equal length. The male differs from the female by its more slender front femora, the stouter basal joint of its antennæ, and the less fine punctuation of the base of its rostrum.

S. Australia; Eyre's Peninsula; on *Casuarina*.

**B. Adelaidæ*, sp. nov. Sat elongatus; parallelus; piceus, squamis cinereis vittatim ornatus, rostro (basi excepta) late sanguineo, antennis tibiis elytrisque plus minusve rufescentibus; rostro quam prothorax longiori, arcuato, subtilissime (basin versus minus subtiliter) punctulato: capite prothorace et elytris ut *B. regalis* squamosis, sed squamis omnibus cinereis, in prothorace vittis lateralibus minus perspicuis; capite et prothorace ut *B. regalis* granulosis; prothorace vix transverso, sat fortiter canaliculato, lateribus a basi fere ad apicem fortiter rotundatis, basi bisinuata; elytris ad basin minus fortiter lobatis, ad apicem acuminatis vix productis, pone scutellum haud callosis, sat crebre antice granulosis postice punctulatis; corpore subtus ad latera dense in medio minus dense niveo-piloso, mox intra partem dense niveo-squamosam linea gracili fere continua denudata ornato; femoribus anticis subtus bidentatis, posticis segmenti secundi ventralis partem mediam fere attingentibus. Long. (rostr. incl.), 5—$5\frac{1}{4}$ l.; lat., $\frac{1}{5}$—1 l.

The squamose markings of the upper-surface are almost exactly as in *B. regalis*, the scales, however, being all of an ashy colour, and those forming the lateral vittæ of the prothorax being less distinct. The markings of the under-surface differ in the absence

of the narrow median longitudinal line of dense pilosity which in that species traverses the otherwise-thinly pilose space between the lateral vittæ. The bright-red colour of the anterior two-thirds of the rostrum seems constant The small size and the scarcely-produced apex of the elytra at once distinguish this species from *B. regalis*.

S. Australia; on the hills near Adelaide.

**B. distinctus*, sp. nov. (Mas.) Angustissimus; parallelus; niger, squamis niveis ornatus; rostro postice crasse antice sat subtiliter punctulato, quam prothorax parum longiori, cylindrico, arcuato; antennarum articulis 3° quam 4us sublongiori; capite prothoraceque minus crebre granulosis (fere ut *B. scalaris*, Germ.), hoc inter oculos niveo-squamoso; prothorace quam latiori sublongiori, canaliculato, canali dense niveo-squamoso, lateribus modice arcuatis, basi bisinuata; elytris ad basin modice lobatis (ut *B. scalaris*, Germ.), ad apicem minus acuminatis haud productis, pone scutellum haud callosis, crasse granuloso-punçtulatis (fere ut *B. scalaris*, Germ.), vitta densa suturali (fere ut *B. suturalis*, Boisd.) et serie dorsali maculari bene determinata niveo-squamosis ornatis; corpore subtus dense niveo-piloso, segmentis ventralibus singulis maculis 3 denudatis (maculis medianis triangularibus) ornatis; femoribus anticis muticis, posticis segmenti ventralis basalis apicem haud attingentibus. Long. (rostr. incl.), $5\frac{1}{5}$ l.; lat.., $\frac{4}{5}$ l.

A very pretty species owing to the strong contrast between the black colour of the general surface and the white pilosity which forms a continuous stripe from the front of the prothorax to the apex of the suture, and also a longitudinal dorsal row (abbreviated in front) of small sharply-defined spots. The pattern on the ventral segments is much like that in *B. abdominalis*, but the denuded spots are much larger, the middle one on each segment (especially on the basal two segments) being of an elongate triangular shape.

S. Australia; Eyre's Peninsula.

**B. tibialis*, sp. nov. (Mas.) Sat elongatus; postice angustatus; rufus, squamis setuliformibus niveis vestitus, his in corpore supra (nisi in prothoracis canali et scutello) æqualiter sparsim in corpore subtus (nisi ad sternorum latera) æqualiter modice dense in scutello prothoracisque canali et ad sternorum latera densissime dispositis, segmentis ventralibus singulis macula parva mediana denudata ornatis, capite rostro antennisque piceis, elytrorum sutura infuscata; rostro sat gracili sat cylindrico sat fortiter arcuato, quam prothorax longiori subtiliter (postice magis fortiter) punctu-

lato ; antennarum articulis 3° 4° que longitudine inter se æqualibus ; supra sat crasse ruguloso-punctulatis ; prothorace quam latiori vix longiori, lateribus modice arcuatis pone apicem leviter sinuatis, basi bisinuatis ; elytris ad basin modice lobatis, ad apicem singulatim acuminatis vix productis, a basi retrorsum gradatim angustatis, latitudine majori trans humeros posita ; femoribus anticis subtus dentibus 2 armatis (altero elongato altero minuto), posticis ultra segmenti ventralis basalis apicem attingentibus ; tibiis anticis ad basin subito arcuatim angustatis, mox ante basin dente magno armatis et hinc ad apicem subtiliter denticulatis ; tarsorum anticorum articulo basali valde dilatato. Long. (rostr. incl.), $4\frac{4}{5}$ l.; lat., $\frac{1}{5}$ l. (vix.)

This is the most remarkable *Belid* I have seen ; it might with some reason be treated as the type of a new genus, owing to the following characters :—Antennæ inserted unusually near to the base of the rostrum, the whitish hair-like scales on the upper-surface evenly and thinly distributed, except in the prothoracic channel, and the remarkable structure (probably sexual) of the front legs. It may be noted that the same structure (except the large tooth below the base of the tibia) is feebly reproduced in the four hinder legs. All the vestiture is really white, but the variation in its density makes it appear to be of three different colours, sc., snowy white on the middle of the prothorax the scutellum and the sides of the sterna, less *snowy* on the abdomen, and still less on the elytra.

W. Australia ; sent to me by E. Meyrick, Esq

The following table shows the relation *inter se* of the species described above :—

A. Front femora unarmed.
  B. Elytra not callose behind the scutellum.
    C. Elytra not carinate.
      D. Elytra not longitudinally concave close to the suture.
        E. Elytra not (or scarcely) produced at the apex (at most much less than in *B. scalaris*, Germ.).
          F. Elytra coarsely sculptured (not less coarsely than in *B. scalaris*, Germ.).
            G. A continuous dense white stripe runs down the prothorax and elytral suture ... distinctus, Blackb

GG. The sutural pilosity forms sparsely-placed spots	abdominalis, Blackb.
FF. Elytra much less coarsely sculptured	difficilis, Blackb.
EE. Elytra produced at the apex (as in *B. scalaris*, Germ.)	ventralis, Blackb.
DD. Elytra longitudinally concave close to the suture ...	Helmsi, Blackb.
CC. Elytra carinate	perplexus, Blackb.
BB. Elytra strongly callose behind the scutellum	bison, Blackb.
AA. Front femora dentate beneath—the teeth equal.	
B. Elytra not callose behind the scutellum.	
C. Dorsal squamosity of the elytra (if any) forms spots.	
D. Elytra strongly produced at apex.	
E. Sides of under-surface with a stripe of dense white pilosity	frater, Blackb.
EE. Under-surface entirely mottled with denuded spots	Flindersi, Blackb.
DD. Elytra not produced at apex	
E. Spots of pilosity on the elytra small, and placed chiefly along the suture...	mundus, Blackb.
EE. Spots of pilosity on the elytra promiscuously scattered, and of very uneven size	elegans, Blackb.
CC. Dorsal squamosity of the elytra forms a well defined continuous vitta	Adelaidæ, Blackb.
BB. Elytra callose behind the scutellum	regalis, Blackb.
AAA. Front femora with two very unequal teeth	tibialis, Blackb.

Haplonycini.

HAPLONYX.

A single example of this genus occurred in the district west of the Fraser Range. It is very near to *H. cionoides*, Pasc., but

does not quite agree with S. Australian specimens of that insect. I do not think, however, that it would be desirable to found a new species on a single example in this large and difficult genus, unless it presented some well-defined distinctive character, which the present species does not.

Cryptorhynchini.

neolybeba (gen. nov.).

Rostrum elongatum gracile leviter arcuatum; scrobes (exempli typici) mediana sat rectæ; oculi grosse granulati; antennæ sat graciles, funiculo 7-articulato; prothorax ad basin fortiter bisinuatus, lobis ocularibus latis; coxæ anticæ contiguæ; femora subtus dentata (anticis angulatis magis quam perspicue dentatis); unguiculi liberi; abdominis segmentum basale (quam metasternum parum longius) quam 2^{am} fere duplo longius, hoc quam 3us 4us que conjuncti parum breviori, sutura prima parum arcuata.

The species for which I propose this new name does not appear capable of being referred to any existing genus. It belongs to the group of *Cryptorhynchides* in which the rostral canal is very short (not separating the anterior coxæ), and which consequently form a connecting link between the *Cryptorhynchides* and *Erirhinides*. Among these it is distinguished by the following characters in combination; rostrum elongate and not subulate, eyes very coarsely facetted (as in *Melanterius*), base of prothorax strongly bisinuate, femora dentate beneath, body densely clothed with scales. The general form is extremely like that of the *Erirhinid* genus *Gerynassa*. Probably *Lybæba* is really the nearest ally of this genus.

N. remota, sp. nov. Testaceo rufa; squamis rufis albidisque (his maculatim intermixtis) confertim vestita; rostro quam prothorax paullo longiori, glabro nitido (parte basali squamosa excepta); antennarum funiculi articulis basalibus 2 elongatis, ceteris sat brevibus; prothorace quam longiori paullo latiori, antice subtubulato; elytris subtiliter punctulato-striatis, interstitiis 3° 5° que apicem versus (et 7° antice) convexis, humeris extrorsum prominulis, interstitiis 3° 5° 7° que hic illic obtuse tuberculatis. Long. (rostr. excl.), $2\frac{1}{5}$ l.: lat. 1 l.

The whitish scales are the most numerous; regarding them as the ground-colour, the red scales form two large ill-defined blotches near the base of the prothorax, and a number of small ill-defined spots on the elytra. The scutellum is white.

Everard Range.

MELANTERIUS.

M. vinosus, Pascoe. Mount Squires.

AXIONICUS.

A. insignis, Pascoe. Victoria Desert.

LONGICORNES.

PACHYDISSUS.

P. Tatei, Blackburn. Murchison District.

PHORACANTHA.

P. semipunctata, Fabricius. Fraser Range.

ATESTA.

This species differs from *Atesta* in the spine of the third joint of the antennæ being almost obsolete, the corner of the joint where the spine might be expected being merely a little produced in a sharp point. The three species which Mr. Pascoe associated to form this genus are characterised as *Phoracanthids*, having the characteristics of their group reduced to a minimum, the antennal spines being only one or two, and the apical spines of the elytra nearly or quite obsolete. This species reaches the lowest point in these respects of any yet described, the spines of the elytral apex being quite, and those of the antennæ all but, wanting.

A. eremita, sp. nov. (Mas.) Sat angusta; minus nitida; sat sparsim pubescens et capillis elongatis erectis vestita; piceo-nigra, antennis (quam corpus paullo longioribus) palpis pedibus et corpore subtus (abdominis lateribus apiceque exceptis) ferrugineis; elytris apicem versus crasse profunde (retrorsum gradatim minus profunde magis subtiliter) punctulatis, flavo-maculatis; ad apicem rotundatis; antennarum articulis 3° 4° que brevissime vix perspicue spinosis. Long., 9 l.; lat. $2\frac{1}{5}$ l.

The yellow marks on each elytron are two spots a little behind the base (placed transversely and probably in some examples confluent), a large irregularly-shaped spot about the middle, not quite reaching either the suture or the lateral margin, and a spot occupying the apex. The head and prothorax are somewhat finely and closely, but not very distinctly, punctured, the latter bearing a median lanciform nitid space with about six ill-defined more or less nitid tubercles on each side, some of them more or less run together (probably variously in different examples) so that they are difficult to count. The length of the prothorax is about equal to its width. On each side one of the tubercles being placed on the lateral declivity makes the segment appear protuberant in the middle when looked at from above. All the

femora are extremely stout, a character very likely to be sexual.

This species is very near to *A. Tatei*, Blackb., but is very distinct from it by reason *inter alia* of its much less nitid surface and the absence of an apical elytral spine, also the presence of yellow markings between the base and middle of the elytra which I have not seen in any example of *A. Tatei*.

Victoria Desert.

APHANASIUM.

I feel considerable hesitation in referring the following species to this genus. Probably Mr. Pascoe (who has done the largest part of the work hitherto on the Australian Longicorns) would found a new genus for it, but as the genera already formed for species more or less allied to the present insect are numerous and perplexing, I am anxious to avoid any risk of increasing the difficulty. Fortunately this particular insect presents notable specific characters that will render its identification easy, and it is certainly very near to *Aphanasium*. In M. Lacordaire's arrangement of the *Cerambycides* the following characters –eyes coarsely granulated, intermediate coxæ open laterally, abdomen slender and cylindrical, with the apical segment elongate—bring its possible location within somewhat narrow limits, and the additional character of its labial and maxillary palpi being equal (or nearly so) *inter se* in length, reduces to two *(i.e., Neostenides* and *Aphanasiides)* the subfamilies in which it could be placed. These two subfamilies appear to me to be very close; M. Lacordaire distinguishes them *inter se* in his tabulation by the anterior coxæ of the former being "moderately prominent," and of the latter "prominent" (a distinction which I do not find workable, as there is, *e.g.*, no marked difference in this respect between *Neostenus Saundersi*, Pasc., and *Aphanasium australe*, Boisd.), and adds in his detailed descriptions several slight and unsatisfactory distinctions, together with the more definite one that in the former the legs are short, the hind femora never reaching beyond the second ventral segment, while in the latter they are "moderately long." In the present insect the front coxæ are about as prominent as in the two species mentioned above, but as the hind femora reach considerably beyond the second ventral segment (being about as long as in *Aphanasium australe)* I must regard the species as an *Aphanasiid*. *Aphanasium* is the only Australian genus of the subfamily yet noticed (unless *Myrsus*, whose habitat is unknown, be Australian, to which genus, however, the present species cannot, I think, be referred, especially as Lacordaire's characters for it in his tabulation and his diagnosis flatly contradict each other; at any rate, the *species* is very unlike the present one)' The abdomen of the insect before me is considerably more narrowly-cylindrical and *Neostenus*-like than

that of *Aphanasium australe*, its hind tarsi (especially the basal joint) are evidently less elongate, and its eyes (in the male) are less widely separated above, but I do not find any other structural character inconsistent with its being congeneric with *A. australe*, although it is very unlike it in size and colouring. It is quite possible that the form of the abdomen may be to some extent due to abnormal shrinkage in drying, and as the comparative approximation of the eyes is not a good generic character, there remains only the form of the hind tarsi, and this seems to me scarcely a sufficient character to require the creation of a new generic name.

In some respects (especially in the colouring and markings) this species resembles *Didymocantha obliqua*, Newm., which I cannot regard as at home among the *Callidiopsides*, where M. Lacordaire places it, its facies being extremely unlike *Callidiopsis*, and the structure of its intermediate coxæ being different from that genus. As, however, the meso-thoracic epimera in the present insect are in contact with the intermediate coxæ, and are separated from them in *Didymocantha*, the two could not in Lacordaire's classification be associated.

It should be noted that the underside of the four posterior femora in this species is concave longitudinally, and is filled (probably in the male only) with short woolly pubescence.

A. variegatum, sp. nov. (Mas). Modice elongatum, sat parallelum; nigrum, elytris (his fusco-notatis) metasterno medio coxis femorum basi summa tibiarum parte basali dimidia tarsis et antennis lividis, harum articulis 1° (basi summa excepta) 3° —5° (ad apicem summum) 6° 7° que in parte apicali dimidia infuscatis; sparsim pubescens; capite brevi sat fortiter sat crebre punctulato; prothorace sat transverso, ut caput punctulato, 11-tuberculato [sc. ante basin transversim 5-tuberculato (tuberculis externis spiniformibus), pone apicem 4-tuberculato, et utrinque tuberculo laterali mediano munito] sic ut latera de super visis tuberculos tres (horum posteriori spiniformi) præbent; elytris ad apicem rotundatis, obsoletissime bicostatis, quam prothorax paullo minus crebre punctulatis, notis fusco-nigris ornatis (sc. linea a humeris retrorsum et suturam versus arcuata, macula marginali mox pone basin, fascia mediana sat angusta in sutura retrorsum producta) et apicem versus indeterminate infuscatis; antennis sat compressis, quam corpus sesquilongioribus, articulis 1° 3° 4° que inter se longitudine sat æqualibus, ceteris sat longioribus; femoribus 4 posticis subtus longitudinaliter depressis et dense breviter lanuginosis. Long., 7 l.; lat., $1\frac{3}{5}$ l.

The prothorax bearing two well-defined tubercles and a spine

on each side, together with the colouring and the elytral pattern resembling the same in *Didymocantha obliqua*, Newm., and the bright livid patch in the middle of the metasternum, will render this species easy of identification.

Murchison District.

APOSITES.

A. niger, Blackburn. Murchison District.
A. lanaticollis, Blackburn. Murchison District.

STEPHANOPS.

**S. nasuta*, Newman. Albany.

SYLLITUS.

S. grammicus, Newman. Fraser Range.

S. uniformis, sp. nov. Supra ferrugineus, antennarum articulo basali femoribus tibiisque concoloribus, antennis (articulo basali excepto) capite tarsisque dilutioribus, prothorace plus minus infuscato ; corpore subtus (capite excepto) nigricanti ; prothorace quam latiori paullo longiori, ab apice ad medium sat cylindrico, a medio ad basin leviter rotundato-ampliato, supra vix inæquali, crebre subtiliter ruguloso; elytris modice (quam prothorax minus crebre minus subtiliter) ruguloso-punctulatis, costis discoidalibus binis sat parallelis instructis. Long., $3\frac{1}{2}$—$3\frac{3}{4}$ l.; lat., $\frac{3}{5}$ l.

Very distinct from the previously described species of the genus by reason of the dark ferruginous general colour of its upper-surface, the elytral costæ being concolorous and only the head exhibiting a brighter reddish tone.

Fraser Range ; I have this species also from S. Australia.

MICROTRAGUS.

M. maculatus, Blackburn. Nilpena or thereabouts.

HEBESECIS.

H. fasciculatus, sp. nov. Niger, tomento nigro-griseo et fusco variegatus, antennarum basi tibiisque nonnullorum exemplorum rufescentibus; capite prothoraceque spinoso confertim punctulatis ; elytris profunde seriatim punctulatis, in dorso pone basin tuberculo nigro-fasciculato et altero minori pone medium ornatis ; antennis pubescentibus, pube in articulis 3° 4° 5° 7° que ad basin, 6° 8° que totis albida. Long., $4\frac{1}{5}$—5 l; lat., $1\frac{3}{5}$—$2\frac{2}{5}$ l.

This species seems very distinct from any other yet described. The arrangement of the colours of the tomentum on the upper surface is very much as in *H. australis*, Boisd., but the pubescence of the sides of the prothorax (which has no dorsal impres-

sion) is of a pale-greyish colour, and the antennæ are very differently coloured; the basal half (or more) of joints 3 and 4, the basal one-third of joints 5 and 7, and the whole of joints 6 and 8 being clothed with whitish pubescence, joints 9 to 11 and the appendiculate 12th joint being of an obscure patchy colour inclining more or less to grey or blackish in different examples. The pubescence of the underside and legs is whitish, and is somewhat close and even, scarcely interrupted or spotted except by the very coarse granulose-puncturation of the metasternum. The antennæ are about half again as long as the body in the male, not much longer than the body in the female. Of the other species of the genus having pilose elevations on the elytra *H. basalis*, Pasc., is very differently coloured and has only one elevation on each elytron; *H. cristata*, Pasc., *inter alia* has the antennæ of the male more than twice as long as the body, and *H. niphonoides*, Pasc., has two costæ on the elytra and the tibiæ marked with rings of brown pilosity. The posterior elevations on the elytra in this species are much smaller than the anterior ones, but are quite well-defined.

Fraser Range; also in my collection from other places in W. Australia.

SYMPHILETES.

S. fraserensis, sp. nov. Ferrugineus, capite antennis femoribus tibiis prothorace antice ad latera scutello et corpore subtus (lateribus summis exceptis) albido-pubescentibus, elytris fulvo-pubescentibus, pone et circa scutellum et in sutura griseo-pubescentibus (linea suturali serie macularum nigrarum variegata), ad latera vitta niveo-argentea lata ornatis (hac a basi apicem attingenti, ad basin breviter angustata, margine superiori insigniter serrato) humeris fere nigris; antennis quam corpus maris paullo longioribus, feminæ vix brevioribus; prothorace leviter transverso, subcylindrico, minus inæquali, supra sat crebre sat subtiliter rugato; elytris leviter minus subtiliter punctulatis, in parte dimidia basali sat fortiter granulatis, ad apicem leviter emarginatis barbatis; coxis anticis inermibus. Long., 8 l.; lat., $2\frac{3}{5}$ l.

The inequality of the surface of the prothorax is very slight and ill-defined, consisting of little more than a transverse depression near the front, and another (the stronger of the two) near the base. The prothorax has no indication of tubercles except a small tubercle (or large granule) on each side near the front. The most distinctive characters of this species seem to be the dense white pubescence entirely clothing the head and antennæ, the very conspicuous leaden-grey pubescence of the suture bearing (on each elytron) a row of round black spots, and

the lateral band of a silvery-white colour. The upper margin of this band rises from the front extremity of the lateral margin, and runs obliquely hindward, and towards the suture to a point immediately behind the black humeral callus, whence it runs in a straight line (parallel with the suture) to the apex; it is marked with about a dozen sharply-defined little indentations, each of which is occupied by a granule or large puncture. Several species previously described resemble this one more or less closely, especially in the combination of a prothorax devoid of strong transverse folds with elytra ornamented laterally with snowy-white pubescence. I have in my collection examples of nearly all of them, but as in the instance of one or two there is a possible doubt of their being correctly identified, I will content myself with mentioning the following characters in which (according to their description) they differ *inter alia* from the present insect. *S. Bathursti*, Pasc., has two small central tubercles on the prothorax, *decipiens*, Pasc., is of a greyish-green colour and has a small triangular dark spot behind each eye, *derasus*, Pasc., has six feeble tubercles on the prothorax, *Duboulayi*, Pasc., has the lateral snowy pubescence of the elytra in the form of an oblong spot, *iliacus*, Pasc., is a smaller insect of dark olive-green colour, *lateralis*, Pasc., has the general pubescence of the head fulvous.

Fraser Range.

S. fumatus, Pascoe. Fraser Range.

S. vestigialis, Pascoe. Fraser Range.

Phytophaga.

DITROPIDUS.

D. cistellus, Germar. Fraser Range.

D. histeroides, Suff.? Fraser Range.

CHRYSOMELA.

C. australica, sp. nov. Elongata; parallela; nitida; convexa; ænea, labro palpis antennis pedibus elytrorumque epipleuris rufescentibus; capite lato minus convexo, sat crebre sat fortiter punctulato, inter oculos fovea sat magna impresso; oculis obsoletissime nec subtiliter granulatis: prothorace transversim subquadrato, quam elytra parum angustiori, sparsim minus fortiter (ad latera paullo magis fortiter magis crebre) punctulato; elytris seriatim punctulatis, interstitiis vix perspicue transversim strigosis. Long., $3\frac{1}{2}$ l.; lat., $1\frac{3}{5}$ l.

This species is clearly, I think, a member of Dr. Baly's genus *Carystea*, which Dr. Chapuis regards as inseparable from *Chrysomela*. If the eyes of all the previously described species are like those of the present one, I think Dr. Baly's genus may

be maintained ; the granulations are not particularly fine, but are so extremely faint as to appear almost non-existent without the use of a powerful lens. This species is probably near *C. micans*, Baly (which I have not to my knowledge seen), but is considerably larger and *inter alia* the puncturation of the sides of its prothorax is not in the least variolose.

Fraser Range.

CHALCOLAMPRA.

C. eremita, sp. nov. Ovalis ; picea, capite rufo, antennis palpis pedibusque brunneo-testaceis, prothorace elytrisque obscure aeneis ; prothorace duplo-punctulato ; elytris sat subtiliter striatis, striis sat fortiter punctulatis, interstitiis sublaevibus vix planis. Long., $2\frac{2}{5}$—$2\frac{1}{2}$ l. ; lat., $1\frac{2}{5}$ l.

The third joint of the antennæ is not much less than half again as long as the fourth joint. The head is somewhat strongly but not at all closely punctulate, and has a fovea on either side near the front. The prothorax is two-thirds again as wide as long, and is considerably narrowed forward ; it bears both fine and also considerably larger punctures (both kinds sparsely distributed except near the sides, where the larger punctures are much closer). The evident (though not strong) convexity of the interstices associates this species with *C. Hursti*, Blackb., from which it differs *inter alia* by the less strongly rounded sides and the narrower front of its prothorax, as well as by its smaller size. Compared with *C. aerrata*, Germ., (which is perhaps the same as *aurea*, Boisd.) the antennæ are much less stout, with the third joint proportionally longer ; the prothorax is much more narrowed in front and much less coarsely punctured ; the elytra are very similar, except in the interstices not being quite flat ; and the puncturation of the under-surface does not appear to differ in any notable manner.

Fraser Range.

CALOMELA.

C. satelles, sp. nov. Oblonga ; pallide fulva, antennis apicem versus nigris, elytris vitta discoidali plus minusve perspicua violacea ornatis ; capite rugulose (quam *C. colorata*, Germ., multo minus crasse) punctulato ; prothorace quam longiori plus quam duplo latiori, crasse fortiter (in medio quam *C. coloratæ* minus crebre) punctulato ; elytris fortiter (quam *C. rittatæ*, Baly, vix minus fortiter) punctulato-striatis. Long., $2\frac{2}{5}$—3 l. ; lat., $1\frac{1}{3}$ -$1\frac{2}{5}$ l.

A very distinct species, easily distinguished from its congeners with fulvous elytra bearing a vitta of metallic colour by the following characters in combination :—Colour entirely pale fulvous, except the apical part of the antennæ and the dusky-violaceous

vitta of the elytra, prothorax coarsely punctured (after the manner of that of *C. colorata*, Germ.), elytra regularly punctulate-striate (except a little confusion in the dorsal rows) as in *C. cittata*, the punctures extremely deep and large (almost as in *C. cittata*, much more coarse than in *C. colorata*, *C. Kirbii*, &c.).

Fraser Range; I have the same species from various localities in S. Australia.

C. imperialis, sp. nov. Oblonga; nigra, supra splendide viridi-cyaneo-aureo et purpureo-micans, pedibus aneo- et cupreo-iridescentibus, antennis ad basin rufis; capite magno sat crebre sat fortiter punctulato, longitudinaliter subtiliter canaliculato; prothorace quam longiori plus quam duplo latiori, sat fortiter sat sparsim (ad latera magis crasse minus sparsim) punctulato, postice quam antice fere tertia parte latiori; elytris vix striatis seriatim sat fortiter punctulatis, interstitiis fere laevibus. Long., 4 l.; lat., $2\frac{1}{3}$ l.

A remarkably handsome species, very distinct from its previously described congeners. The blending of the iridescent colours on the upper surface is almost too intricate for detailed description; on the head there are four transverse, not sharply-defined, zones of colour as follows (from the hinder part forward): golden, purple, cyaneous, purple; on the prothorax the zones are longitudinal, being purple in the middle, and on either side successively green, purple, green. On each elytron, starting from the suture, there are longitudinal vittæ as follows:—purple, green, purple, green, purple, green. The wings are of a rich crimson colour. The head is singularly like that of *Chrysomela* (*Carystea*), except in its eyes being more strongly granulated; indeed, the insect bears a strong general resemblance to *Carystea*, with the claws of a *Calomela*.

Nilpena, or thereabouts.

PAROPSIS.

P. lateralis, sp. nov. Breviter ovalis; minus nitida; nigro-picea, capite prothorace elytrorum margine laterali pedibus antennarum basi et maculis 2 (in segmento ventrali apicali positis) ferrugineis; capite fortiter subrugulose punctulato; prothorace quam longiori triplo latiori, sat subtiliter sat crebre (ad latera crasse confertim) punctulato, lateribus sat arcuatis; elytris sat fortiter vix seriatim punctulatis et lineolis sublaevibus nonnullis instructis. Long., $5\frac{1}{3}$ l.; lat., $4\frac{1}{3}$ l.

This species belongs to Dr. Chapuis' "second division" of the genus; none of the described species in that division bear much resemblance to it.

Nilpena, or thereabouts.

P. squiresensis, sp. nov. Ovata; minus nitida; nigro-picea, labro antennis pedibusque rufescentibus; capite prothoraceque sat fortiter sat crebre punctulatis; hoc ad latera magis crasse punctulato, quam longiori paullo magis quam duplo latiori, lateribus sat arcuatis, postice quam antice vix dimidio latiori; elytris crassissime rugulose punctulatis, in parte dimidia apicali sat crebre (apicem versus creberrime) verrucosis. Long., $3\frac{1}{2}$—4 l.; lat., 2—$2\frac{2}{3}$ l.

This species is a member of Dr. Chapuis' "fourth division" of the genus. In shape it resembles *P. caliginosa*, Chp., except in its prothorax being very evidently less transverse; the prothorax is much more closely and evenly punctured, and the elytra are very differently sculptured, there being no defined tuberosities on the anterior half, but numerous closely and irregularly placed ones on the posterior half, especially near the apex.

Mount Squires.

P. nigropicta, Clk. ? Several specimens appertaining to an extremely variable species appear to be the insect to which it is probable that Mr. Clark gave this name. No individual among them agrees exactly with the description, and no two of them are quite identical *inter se*. They are of a bright red colour with black markings, which vary considerably in size and shape. In some the labrum is black (as in Clark's description), in others red, in some the legs are red with dark markings (as in description), in others almost black, and the colour of the under-surface varies from red (as in description) to nearly black. The species to a casual glance bears a remarkable resemblance to *Coccinella repanda*, Casstroem.

P. variabilis, Chp., var. ? West of Fraser Range. The prothorax seems a little more closely and strongly punctured than in S. Australian examples, and it is possible this may indicate a distinct species.

MENIPPUS.

M. elegans, Blackb. As noted (in Proc. Linn. Soc. N.S.W., 1890, p. 362) the structural characters of this insect do not agree quite satisfactorily with those of the typical species of *Menippus*.

Nilpena; on flowers of *Santalum acuminatum*.

BROSCIDES

(SUB-FAM. OF COLEOPTERA).

By THOMAS G. SLOANE, F.E.S.

Before dealing with the species of the sub-family *Broscini* which follow, it is necessary to offer some remarks on the classification of those Australian Broscides which are characterised by having the sinus of the mentum without any median tooth-like projection. These are comprised in five genera, viz., *Gnathoxys* (Westwood), *Parroa*, *Adotela*, *Cerotalis* (Castelnau), and *Brithysternum* (Macleay, W.). It is only with those species that fall into the genera *Parroa*, *Adotela*, and *Cerotalis* that we are at present concerned. In forming these three genera, Count de Castelnau (Trans. Roy. Soc. Victoria, VIII., 1868) relied entirely on features belonging to the male to separate them from one another. The differences he gives may be tabulated as follows :—

Male with last joint of palpi thick, oval, truncate ; anterior tarsi not clothed with spongiose tissue below. *Parroa.*

Male with last joint of palpi securiform ; three basal joints of anterior tarsi with spongiose tissue below. *Adotela.*

Male with last joint of palpi truncate ; four basal joints of anterior tarsi with spongiose tissue below. *Cerotalis.*

The late M. Putzeys, in monographing the *Broscini* in 1868 (Stett. Ent. Zeit.), united Castelnau's genus *Cerotalis* with *Promecoderus*, but followed that author in maintaining *Parroa* and *Adotela* as separate genera. Returning to the subject in 1873, he reviewed the Broscides of the Castelnau collection (Ann. Mus. Civ. Genov., IV.), when he still united *Cerotalis* with *Promecoderus*, and also united *Parroa* with *Adotela*, believing the genus *Parroa* had only been founded on female specimens of *Adotela*. He remarks (p. 337)—"Toutes les *Parroa* de la collection sont des males et les *Adotela* females ne différent pas des *Parroa*,"

In 1890, when reviewing the genus *Promecoderus* and the Australian Broscides allied to it (Proc. Linn. Soc. N.S.W. (2), V.), I regarded (as I still do) *Cerotalis* as distinct from *Promecoderus*, but I united *Parroa* with *Adotela*, remarking (p. 229) :- "When de Castelnau wrote on the Australian *Broscini* in 1867, he was misled by the very different form of the palpi in the different sexes of this genus, and formed a separate genus for each sex." In extenuation of my mistake in thus misrepresent-

ing the value of Castelnau's observations on these insects, I can only plead that I thought M. Putzeys' evidence that all the species of *Parroa* in the Castlenau collection when he went over them in 1873 were females, was conclusive proof Castelnau was in error in attributing to the males of *Parroa* nonsecuriform palpi and non-spongiose anterior tarsi.

I have now seen three species in which the male is certainly without spongiose tissue on the underside of any joints of the tarsi; so it is evident Castelnau was right. Either such male specimens must have been lost before M. Putzeys looked through the Castlenau collection; or he spoke after a mere superficial examination of the specimens before him, when he said all the species of *Parroa* were females.

I am now able to make a considerably more extended review of the forms comprised in the genera *Parroa*, *Adotela*, and *Cerotalis* than in 1890; but my knowledge of the previously described species is confined to so few species that I can suggest no alteration in their classification, nor can I find any decided differences, apart from sexual characters, between them. Genera founded entirely on features appertaining to one sex seem to me too artificial to be maintained in a natural system of classification; but, when our knowledge of a group is too slight to enable us to divide it into genera of undoubted natural value, an artificial system must be adopted, and this seems such a case. As will be seen from my remarks on the genus *Parroa*, which follow, I am doubtful of the position of many species; but the material I have clearly indicates that, either all the species now placed in the genera *Parroa*, *Adotela*, and *Cerotalis* will have to be united in one genus, or new genera will in all likelihood be required for *Parroa (Adotela) australis*, Sl., and similar forms; for *Parroa apicalis*, Sl.; and possibly for *Adotela Frenchi*, Sl. There seems little doubt but that we may expect many new species of *Broscini* to be found in Australia, which, when obtained, will enable us to determine the true classificatory value of the differences between forms such as those on which the genera *Parroa*, *Adotela*, and *Cerotalis* have been established. In the meantime, to make new genera for apparently aberrant forms would in all probability merely cause confusion and instability of nomenclature, troubles already only too rife in zoology.

Genus Parroa.

I regard *P. Howitti*, Casteln., as the type of the genus *Parroa*: with it may be associated *P. grandis*, Casteln., and *P. noctis*, Sl. (n. sp., *vide post*). These species seem united by a similarity in the form of the labrum, antennæ, femora, posterior trochanters, tarsi, &c.; but, as the male of neither *P. grandis* nor

P. Howitti has yet been recorded, there must remain some doubt as to the amount of affinity amongst them.

Adotela australis, Sl. (which I now know to have the male with non-securiform palpi, and non-spongiose anterior tarsi); *Adotela atronitens*, Sl. (which is too closely allied to *Parroa australis*, Sl., to be disassociated from it); and *Parroa lævigata*, Sl. (n. sp., *cide post*), form a group distinguished from the *P. Howitti* group by their emarginate labrum, lighter and less flattened femora, not channelled below for their whole length; narrower posterior tarsi, with apical joint narrowed to base: short very obtuse posterior trochanters; bordered basal margin of prothorax, &c. *Parroa apicalis*, Sl. (n. sp., *cide post*) may possibly be an *Adotela*; in any case it has but little affinity to either of the groups mentioned above. Three other species have been referred to the genus *Parroa* by De Castelnau, viz., *P. carbonaria*, Casteln.; *P. violacea*, Casteln.; and *P. bicolor*, Casteln. These are only known to me by too short descriptions, but I should think *P. carbonaria* was rightly placed in *Parroa*, while *P. violacea* and *P. bicolor* may likely prove species of *Adotela* when the male is reported. Three species of *Adotela*, viz., *A. striolata*, Putz.; *A. nigerrima*, Macl., and *A. frenchi*, Sl., have been described without any notice of the male. I should think it quite likely that they will all prove to have the male characters those of *Parroa* rather than of *Adotela*, but they must remain in the latter genus till the male is recorded.

Parroa grandis, *Castelnau.*

Trans. Roy. Soc., Victoria, 1868, VIII., p. 174; Putzeys, Stett. Ent. Zeit., 1868, p. 350; *Adotela grandis*, Putzeys, Ann. Mus. Civ., Genov., 1873, IV., p. 337; Sloane, Proc. Linn. Soc., N.S.W., 1890 (2), V., p. 237.

Female.— Form broad, convex, robust. Black, shining. Head broad, short (6 x 6·5 mm.), smooth, excepting a slightly rugulose shallow impression on each side between the eyes; clypeal suture distinctly impressed, curved; clypeus truncate, declivous in front, a small puncture on each side very near the edge; eyes round, convex, not prominent or inclosed behind. Mandibles short, strong. Labrum short, without median sulcus; anterior angles quite rounded off; middle of anterior margin truncate. Antennæ short, thick, subfiliform; the joints very little flattened, second shortest—shorter than the fourth—last oval, pointed at apex. Prothorax broader than long (8·5 x 10·5 mm.), widest about half-way between the marginal punctures, lightly and shortly narrowed behind, convex (the disc a little depressed), not declivous behind, longitudinally rugulose near anterior and basal margins (the ruga of the basal part stronger and more irregular); anterior

margin somewhat sinuate between the lateral borders; base truncate, not bordered; anterior angles broadly and shortly advanced, obtuse, their inner margin very oblique; basal angles rectangular; lateral border *entire*,* thick, narrow in middle, widening in front to anterior angles, thicker and more prominent behind, not sinuate before the base: median line rather strongly impressed, not reaching anterior margin, losing itself in the rugulose part behind. Elytra smooth, broadly oval (18·5 x 11 mm.), subparallel on sides, shortly rounded to pedunele, broadly rounded behind, convex, declivous behind, hardly at all declivous to pedunele behind scutellum; suture deeply impressed on disc; border narrow, slightly wider behind: a row of unequally and rather widely-placed punctures at a little distance from the margin. Prosternum transversely and irregularly striolate in front of the coxæ, strongly declivous to anterior margin, not excavate between the coxæ, truncate behind. Inflexed part of pronotum projecting sharply beyond the episterna. Ventral segments covered with fine irregular scratches; apex rugulose. Femora broad, flattened, irregularly transversely striolate, longitudinally excavate below for whole length; posterior ones strongly dilatate on lower side behind the middle: anterior tibiæ wide at apex, ending externally in a dentiform projection, outer edge thin with one or two very minute projections; four posterior tibiæ dilatate at apex, their outer edge concave: posterior trochanters transversely striolate, oval, narrowed to apex and obtuse: posterior tarsi of moderate length; joints 1—4 successively shorter, first not as long as two succeeding ones together, last short, convex, hardly narrower at base.

Length, 29; breadth, 11 mm.

Habitat.—Murchison District, West Australia.

This is the largest species of the genus, its affinity is to *P. Houritti*, Castelu., from which its greater size and broader form help to distinguish it. I have only seen the specimen described above, and have been unable to compare it with *P. Houritti*.

The description above may be supplemented by reference to the following points, the value of which, though I have found them worthy of notice in separating the species of *Parroa* and *Adotela*, I have not been able to satisfactorily determine from want of a sufficient number of specimens to examine. The sinus of the mentum is bordered, thus causing the bottom of the emargination to assume a lightly bisinuate form, the middle being

*The lateral border of the prothorax being sometimes (as in *Adotela Frenchi*, Sl.) obsolete before reaching the base, I have, for the sake of brevity, thought it convenient to call it *entire* when it reaches uninterruptedly along the sides from the anterior to the basal margin.

somewhat produced; the penultimate joint of the labial palpi is plurisetose in front and dilatate towards the apex; that of the maxillary palpi is short and triangular, with a seta projecting forward internally; these features are found in other species of the genus and also in some species of *Adotela*. The puncture usually found among the CARABIDÆ towards the outer side of the anterior femora, near the apex, is wanting.* The posterior coxæ have only a single puncture on each near the inner margin, a little before the insertion of the trochanters.† In all allied species known to me this puncture is present. In the specimen before me the anterior part of the clypeus is covered with minute punctures.

Parroa noctis, *spec. nov.*

Form rather elongate, convex, robust, smooth on upper surface. Entirely of a deep shining black. Head large (6 x 6 mm.), convex, smooth; frontal impressions obsolete; clypeal suture lightly marked, extending forward obliquely on each side: clypeus truncate, a foveiform puncture on each side; eyes convex, not prominent or inclosed behind. Mandibles strong, elongate. Labrum prominent, subrotundate in front, longitudinally sulcate in middle. Antennæ rather thick, filiform; basal joint‡ thick, second shorter than fourth, last narrow, fusiform. Prothorax very little broader than long (8·75 x 9·25 mm.), widest rather before the middle, gently and but little narrowed behind, lightly convex, not declivous behind; basal part defined by a shallow broad

* I believe the presence or absence of this puncture (which I propose to call *the external apical puncture* of the anterior femora) to be of some classificatory value among the CARABIDÆ; its presence is invariable in all the Australian Broscides I have seen, excepting the present specimen. If normally absent in *P. grandis*, it seems probable its loss is owing to the rugosity of the part of the femur where it is usually found. It is almost obsolete in *P. noctis*, Sl.

† The punctures found on the posterior coxæ of nearly all the CARABIDÆ seem capable of use in classification, but I have not been able to find that they have yet been so used, or to come to any definite conclusion as to how much value attaches to them. The usual number of these punctures among the CARABIDÆ seems to be three; and, as one, two, or all three of these may be wanting, it appears necessary if they are to be referred to, for them to be named. I therefore propose the names—(a) *anterior puncture*, (b) *apical puncture*, (c) *inner marginal puncture* of posterior coxæ; according as they are placed (a) at about half the breadth of the anterior part of the coxa, (b) near the apex of the coxa, (c) near the inner margin of the coxa a little before the insertion of the trochanters. When all three punctures are present the coxæ may be called *tripunctate*.

‡ It may be noted that in this species the setigerous puncture usually so conspicuous on the upper side (towards the apex) of the basal joint of the antennæ among the CARABIDÆ is wanting. This puncture may prove of classificatory value in some groups of the CARABIDÆ. *P. noctis* is the only Broscide that has come under my notice in which it has been wanting.

impression reaching almost to the sides at their posterior sinuosity ; anterior margin truncate between the lateral borders ; base truncate, not bordered ; anterior angles advanced, obtuse, their inner margin slightly oblique ; basal angles rectangular; lateral border *entire*, thick, gradually widening in front from anterior marginal puncture, narrower and equal backwards from that puncture, lightly sinuate before the base ; median line lightly impressed, not reaching either margin. Elytra smooth, oval (16·5 x 10 mm.) subparallel on sides, gently rounded to peduncle and to apex, convex, very declivous behind, hardly at all declivous to peduncle behind scutellum ; suture lightly impressed ; border narrow, becoming wider behind ; a row of unequally and widely-placed punctures at a little distance from the margin. Prosternum transversely impressed in front of coxæ, rounded behind and projecting slightly backwards, not excavate between coxæ, sharply declivous to anterior margin. Ventral segments smooth, impunctate. Femora broad, flattened, very lightly channelled below for whole length ; posterior ones strongly dilatate on lower side behind middle : anterior tibiæ with external edge smooth, not ending in a dentiform projection at apex ; four posterior tibiæ dilatate at apex, their outer edge not concave : posterior trochanters (in the male) very long, pointed, bent inwards near apex : posterior tarsi short, thick ; joints 1–4 successively shorter—first, short (not as long as two succeeding ones together), 2–4 short, broad, turbinate, last convex, not narrowed to base.

Length, 28 ; breadth, 10 mm.

Habitat. Murchison District, West Australia.

This species is readily distinguished from *P. grandis*, Casteln., by its more elongate form. Five specimens have come under my notice ; three of these agree in all particulars with the description given above, and one of these is certainly a male. The other two are females, and differ from the description only in the shape of the posterior trochanters, which are almost as in *Parroa grandis* (female), being oval and narrowed to the bluntly pointed apex, and not elongate, narrow, and bent as in the other specimens. The elongate bent posterior trochanters seem peculiar to the male ; the male of both *P. grandis* and *P. Howitti* may be expected to have similar trochanters. The posterior coxæ in all these specimens have each a single puncture near the inner margin a little before the insertion of the trochanters. The male alluded to above I have received very recently from Mr. French, of Melbourne, as coming from the Gnarlbine Goldfields, W.A. It is a fresh and perfect specimen, and has the apex of the anterior tibiæ fringed on their inner side with fulvous hair and produced forward in a strong spur about half as long as the inner apical

spur. (I find the same feature, though in a less marked degree, in the type specimen of *Adotela Frenchi*, Sl.)

Parroa lævigata, *spec. nov.*

Form light, elongate ; dorsal surface lævigate. Shining black.

Male.—Head large, not narrowed behind eyes, occipital part smooth, wide, convex ; a broad shallow impression on each side between the eyes extending forward to the clypeus ; front convex between these impressions ; clypeal suture indistinct ; clypeus very lightly emarginate in front, a shallow triangular impression on each side, having a setigerous puncture placed at its inner angle ; eyes round, convex, not prominent or inclosed behind. Labrum short, lightly emarginate and sexsetose in front ; the anterior angles rounded ; median sulcus wanting towards anterior margin, but perceptible near clypeus. Penultimate joint of maxillary palpi short, triangular, with a short erect seta on inner side ; last joint a little flattened, lightly narrowed to apex, truncate ; penultimate joint of labial palpi with two setæ in front and two shorter ones (one on each side) at apex ; last joint broad, hardly narrowed to apex, truncate ; external edge arcuate. Antennæ slender, sub moniliform ; second joint shorter than fourth ; last short, obtuse. Prothorax subcordate, as long as broad (5 x 5 mm.), widest a little before the middle, convex, lightly declivous behind ; sides subparallel between the marginal punctures, shortly rounded to anterior angles, lightly narrowed behind ; base truncate ; anterior margin truncate between anterior angles ; these shortly but decidedly advanced ; basal angles rectangular ; marginal border narrow, a little widened in front to form the anterior angles, very narrow on sides near base, lightly sinuate before the base, wider, less reflexed, and entire on base ; median line lightly impressed ; a well-marked oblique line extending from each anterior angle about one-third across the prothorax just behind the anterior margin. Elytra oval (9 x 5·5 mm.), convex, lightly declivous behind, declivous to peduncle behind scutellum ; sides subparallel in middle ; shoulders rounded off ; apex broadly rounded ; suture strongly impressed ; lateral border narrow, equal ; a single puncture at the base of each elytron ; three lateral punctures on each side, one behind the shoulder, the other two a little distance apart where the apical curve of the elytra begins. Prosternum deeply excavate between the coxæ, not produced backwards behind them, smooth in front of coxæ ; anterior margin bordered. Ventral segments smooth, without lateral impressions, ambulatorial setæ present, two punctures on each side of anus. Legs light ; femora not channelled below ; anterior dilatate in middle, posterior with lower side not produced in middle ; anterior tibiæ with apex wide and forming a

sharp dentiform projection externally: posterior trochanters broad, short, widely rounded at apex: tarsi narrow, without spongiose tissue on underside of anterior ones: posterior elongate; joints 1–4 successively shorter—first, long, about as long as two succeeding ones together, last narrowed to apex.

Length, 15·5; breadth, 5·5 mm.

Female differing from male in its rather lighter form; smaller head; prothorax proportionately narrower than elytra (4·25 x 4·25 mm.); elytra more convex and less widely rounded behind (8·75 x 5·25 mm.); last joint of the palpi narrower.

Length, 14·5; breadth, 5·25 mm.

Habitat.—Barrow Range, Central Australia. Two specimens, male and female.

This species is allied to *P. australis*, Sl., and *P. atronitens*, Sl., from both of which species it may readily be distinguished by the slightly projecting anterior angles of the prothorax, by both prothorax and elytra being less rounded at the middle of their length, and by the decidedly impressed suture of the elytra. These three species all have the posterior coxæ tripunctate.* *P. carbonaria*, Castelu., a black species from West Australia, very little larger than the present, I have never seen; it differs by description in having the labrum rounded.†

Parroa apicalis, *spec. nov.*

Form broad, convex; upper surface smooth, excepting apex of elytra. Black, shining. Head large (5·25 x 5·25 mm.), smooth, wide, but not swollen behind eyes; front with two well-marked long parallel impressions extending to margin of clypeus near its anterior angles; clypeal suture fine, bent forward sharply on each side, a small puncture on each side at the angles made by the lateral bend; clypeus with anterior margin very lightly concave, a foveiform setigerous puncture on each side; eyes round, convex, not prominent or inclosed behind. Mandibles long,

* See note, *ante* p. 207.

† I have lately obtained specimens (both male and female) of *Parroa australis*, Sl., as coming from South Australia, but without exact locality. I am therefore able to report that the male is comparatively broader than the female, the elytra having a shorter and more convex appearance. The maxillary palpi have the penultimate joint very short and triangular with a seta projecting forward on the internal side, the last joint oblong, thick, truncate, a little narrowed to apex; the labial palpi have the penultimate joint bisetose in front, and without setæ at apex, the last joint thick, arcuate externally, narrowed to apex, truncate. The legs are light, the anterior femora slightly dilatate in middle, the anterior tarsi not dilatate or with brushes of spongiose tissue on underside; the posterior tarsi narrow; joints elongate, first long, hardly as long as two succeeding ones together, last elongate, narrowed to apex. Length, 15·5; breadth, 5·5 mm. Specimens before me vary in length from 14·5 mm. to 17 mm.

acute. Labrum canaliculate; anterior angles lightly rounded; margin sexsetose, lightly concave. Antennæ filiform; second joint as long as fourth. Prothorax broader than long (6·75 x 7·5 mm.), subparallel on sides, narrowed to base, subconvex, slightly declivous behind; the basal part defined by an entire obsolete impression; median line finely but distinctly impressed, crossed along its whole length by very fine striolæ; sides covered with minute transverse striolæ; anterior margin very lightly sinuate between lateral borders; base truncate, lightly bordered on each side near basal angles; anterior angles rather strongly advanced, narrowly obtuse, their inner margin almost straight; basal angles rather acute, projecting a little backwards and downwards; lateral border rather wide, with thick reflexed edge, widening in front from a little behind anterior marginal puncture, bent downward before the base, a little narrower after the sinuosity thus caused. Elytra ovate (12 x 8·5 mm.), widest rather behind the middle, convex, declivous to peduncle; posterior part declivous, and rugose towards apex; sides subparallel in middle, lightly rounded to peduncle, broadly rounded at apex; suture fine, very narrowly impressed; border narrow on sides, wider behind; two fine punctures on margin at shoulder, none along sides, a few near edge of posterior-third, becoming lost in the apical rugosity. Prosternum smooth, sloping gently to anterior margin; base emarginate; episterna very finely transversely striolate under a lens. Ventral segments smooth, excepting for a few scattered scratches; segments 3 -6 lightly impressed on sides, these impressions very shallow and wide, more distinct on two apical segments. Legs light: femora excavate below only near apex; anterior rather wider, a little flattened; posterior long, not dilatate in middle: posterior trochanters short, obtuse at apex: posterior tarsi narrow; joints elongate, first long (about as long as two succeeding ones) last long, cylindric, narrowed to base.

Length, 21; breadth, 8·5 mm.

Habitat.—Australia (exact place of capture uncertain). In the collection of Rev. T. Blackburn.

This species seems an isolated one by its facies, and the form of the basal angles of the prothorax, before which the lateral border slopes sharply downwards, causing them to become acute. The elytra are much broader behind than in any other species I have seen, and far more strongly rugose towards the apex; this rugosity extends over most of the posterior declivity. The emargination of the mentum is quite edentate and even rounded behind. Only the labial palpi are present in the specimen before me; they are more slender than in any other *Parroa* I have seen; the two last joints are of about equal length, the last is

truncate at apex, greatly narrowed to base, and a little arcuate externally. The ventral segments have distinct lateral foveæ, and the apical one is without any punctures at the sides of the anus; characters I have not before seen in the genus. The emargination of the prosternum behind the coxæ is an unusual feature in the genus. The "anterior" and "inner marginal" punctures of the posterior coxæ only are present.*

Adotela esmeralda, *Castelu.*

Loc. cit., p. 175; Putzeys, Ann. Mus. Civ. Genov., IV., p. 340; Sloane, loc. cit., p. 234.

Female.—Form oval, very convex; suture of elytra not forming a depression; anterior angles of prothorax very slightly advanced; upper surface lævigate, excepting apex of elytra.

Very shining, general colour black, elytra blackish-green, the green tint becoming bright on sides and inflexed part, a green flush along upper lateral margin of prothorax, also on most of its under-parts. Head smooth, excepting clypeus, large (4 x 1·25mm.), convex, wide, but not swollen behind eyes; front with two broad, shallow impressions diverging a little behind and extending forward across the clypeus, the space between these impressions lightly convex; clypeal suture very fine, interrupted in frontal impressions, bent forward at each side, a fine puncture on each side at the angle made by the lateral bend; clypeus a little rugulose, the lateral setigerous punctures shallow, not near edge; eyes round, convex, not prominent or inclosed behind. Labrum short, lightly emarginate; anterior angles rounded. Antennæ filiform; second joint shortest, though only a little shorter than fourth. Prothorax short (5·5 x 6·25 mm.), convex, slightly declivous behind; basal part defined by a light transverse impression not reaching to near the margins; sides rounded, very little narrowed in front, shortly but decidedly so behind; anterior margin truncate between lateral borders; base truncate, with only a slight trace of a border on each side near margin; anterior angles obtuse, very little advanced, their inner margin sloping backwards very gently; basal angles rectangular; lateral border *entire*, narrow, a little sinuate before the base; median line lightly impressed on disc. Elytra smooth, excepting a little rugosity near apex, oval (11·5 x 7·25 mm.), very convex, declivous to the peduncle, and strongly so behind; sides lightly rounded, a little more shortly so to base than to apex; suture fine, not impressed; border very narrow on sides, widening continuously, and becoming broadly reflexed from posterior-third to apex; marginal punctures wanting on middle of sides (two or three near shoulders, and four or five on posterior-third). Prosternum

* See note, *ante*, p. 207.

gently declivous in front to anterior margin, not excavate between the coxæ; base round, with a small projection behind. Ventral segments smooth. Legs light: femora -anterior thickest, flattened; intermediate narrow, longer than anterior; posterior widest in middle, a little sinuate before apex on lower side: tibiæ—anterior wide at apex, ending externally in a dentiform projection, external edge smooth; intermediate with outer edge concave, dilatate at apex, and ending externally in a flattened pointed projection: posterior trochanters smooth, short, regularly oval: posterior tarsi narrow, elongate; joints 1–4 successively shorter, first about as long as two succeeding ones together, last not elongate, convex, hardly narrowed to base.

Length, 19; breadth, 7·25 mm.

Habitat. —Murchison District, W.A.

The described species that can be undoubtedly referred to the genus *Adotela* are *A. concolor*, Castlen., *A. esmeralda*, Castlen., *A. carenoides*, Putz., and *A. viridis*, Macl. The difference in colour is in itself sufficient to distinguish the first from the second, while the projecting angles of the prothorax at once separates both these from *A. carenoides* and *A. viridis*. In the specimen described above, the posterior coxæ have two punctures, the "apical" and the "inner marginal."*

AMYCTERINI.

FAM. CURCULIONIDÆ.

By T. G. SLOANE, F.E.S.

The *Amycteridæ* of the Elder Exploring Expedition number sixteen species, all belonging to that division of the family characterised by having the scape of the antennæ passing the eye. I regard all as undescribed species; of this I feel the more confident because I have been able, during a hurried visit to Sydney, to compare them with the types of the Amycterides described by the late Sir William Macleay, and so to assure myself that none was among the species of that author.

It is not easy to determine the previously-described *Amycteridæ*, owing partly to the close resemblance of many of the species making their exact description difficult, and partly owing to the lamentable conciseness former authors have adopted in diagnosing their species. To their too-brief descriptions they all, unfor-

* See note, *ante*, p. 207.

tunately, seem to have added the fault of carelessness, particularly in apparently guessing at the sex of their specimens; this is shown by their sometimes giving characters that evidently belong to a female, as those of a male, and *vice versa*. No description of an Amycteride is of practical use unless the sex of the insect described is ascertained beyond any doubt, and given. The sex of all the specimens described in the following paper has been determined with certainty. This may be done very easily by relaxing the specimen and examining the pygidium, which in the male (as in the *Otiorhynchidæ)* is transversely divided, so that there is a segment more on the upper side of the abdomen in the male than in the female.

There seem many features of importance that have been overlooked by former writers on the *Amycteridæ;* some of these have been used in the descriptions that follow, while others, that seem capable of use, have been passed over as being rather of generic than specific value, the use of such features tending to overload descriptions of species and detract from their perspicuity. No doubt some of the features used in the following descriptions (as the relative length of the apical ventral segment as compared to the two preceding ones together) are of more than mere specific value, yet they are of too obvious importance to be omitted from the description of a species; at least till they have been tabulated, and their true value determined; such a work would involve an exhaustive study of the *Amycteridæ*, and is quite beyond the scope of this paper.

I would note that, to my mind, the ocular lobes of the prothorax cannot be considered as having, among the *Amycteridæ*, the classificatory value attributed to them by Mr. Pascoe in his table of genera of the long-scaped *Amycteridæ* (Jour. Linn Soc., XII., 1873, p. 21). In the genus *Acantholophus*, while many species *(A. Marshami*, Kirby, &c.) have the ocular lobes well developed, others have them almost *(A. denticollis*, Macl., &c.), or quite *(A. granulatus*, Sl.) wanting; in *Cubicorhynchus*, too, the "lobes" are sometimes present, though generally wanting. For this reason, and, because the ocular lobes seem not really processes of the prothorax, but rather to be caused by the post-ocular sinuosity of the anterior margin, I have preferred to note the shape of the anterior margin without particular reference to the "lobes."

A reference to the humeral interstice of the elytra seems needful. Sir William Macleay, disregarding the sutural interstice, calls the humeral the fourth interstice, and when explaining his divisions of the genus *Sclerorhinus* (Trans. Ent. Soc. N.S.W., I., 1865, p. 335) remarks that the fifth is more properly a lateral interstice. It is evident the sutural interstice should be counted,

and this causes the humeral one, in most Anyceterides, to be strictly speaking the fifth; while the infra-humeral interstice, called by Sir William Macleay the fifth, should be considered as the sixth.

Genus Talaurinus.

There are eight species in the collection that may be referred to the genus *Talaurinus*, and, as far as I know, none is very closely allied to any previously described species.

Four (*T. regularis*, *T. solidus*, *T. Helmsi*, *T. æqualis*) are allied species showing a relationship to the "granulate" section of the genus; their sculpture is, however, much rougher than any "granulate" species known to me; they might be regarded as forming a separate (*roughly granulate*) group. Though quite distinct species, all agree in general appearance, form of rostrum, and conformation of under-surface in both sexes.

The fifth species (*T. crassiceps*) seems quite *sui generis*.

The three remaining species (*T. obscurus*, *T. noctis*, *T. insignis*), with a fourth species here described, but not belonging to the Elder Expedition collection (*T. conveuus*), are aberrant species that I cannot place in any of Sir William Macleay's sections of the genus; they are more allied to *T. rugiceps*, Macl., than to any other previously described species I have seen. *T. noctis*, *T. insignis*, and *T. conveuus* have obvious affinities to the genus *Sclerorhinus* in the form of the rostrum and the conformation of the under surface. It seems to me that the division of the *Anycterida* into genera founded chiefly on the form of the rostrum is too artificial to be much longer maintained. When a more natural system comes to be adopted it is probable these species will be removed from *Talaurinus*.

Talaurinus regularis, *n. sp.*

Oblong, very robust; prothorax granulate; elytra striate, the interstices regularly granulate. Black, the granules shining; spaces between the granules filled with fine cinereous scales, these thicker on elytra and forming a stripe along their margin; under-surface with cinereous-yellow scales down middle of ventral segments.

Rostrum short, narrower than head, deeply excavate, transversely impressed between external ridges at base; external ridges setigero-punctate, diverging a little in front, internal ridges obsolete — merely short processes of posterior-half of external ridges. Head broad, short, convex; front a little flattened behind rostrum; occiput with cinereous pilose scales.

Male.—Prothorax a little broader than long (5 x 5½ mm.), lightly and regularly convex transversely, lightly dilatate on sides, widest a little before the middle; disc very lightly convex

longitudinally ; anterior margin strongly sinuate, middle rounded and projecting very lightly above head ; base truncate ; granules closely placed, round, unequal, separate, unisetigerous, extending on sides to near coxæ. Elytra ovate (11 x 7½ mm.), rounded on sides, dilatate behind middle, decidedly narrowed to shoulders, very strongly and roumded declivous behind ; convex towards each side, lightly convex longitudinally ; disc depressed along suture ; base lightly emarginate ; the shoulders advanced in a strong truncate tuberculiform projection; apex wide, without sinuosity or projections near suture ; striæ uneven at bottom, having along their course very small setigerous granules between the granules of the interstices ; dorsal interstices closely set for whole length with strong, separate, unisetigerous granules becoming conical and tuberculiform on posterior declivity ; granules of first interstice small, round, evenly placed ; third and fifth interstices with the granules forming a double row in places. Metasternum convex, much raised above the plane of the first ventral segment. First ventral segment very lightly, widely, and flatly hollowed between coxæ ; second flat ; second, third, and fourth with a very light oblique impression on each side; apical segment longer than two preceding ones together, deeply excavate : the excavation parallel sided, rounded at bottom, extending for whole length of segment ; a short pointed tuft of bristles placed on each side of anal excavation between last ventral segment and pygidium. Legs light ; femora cylindrical, anterior without a ridge on lower side.

Length, 18 ; breadth, 7½ mm.

Female. -Differing from male in its broader, heavier, and flatter form ; prothorax less dilatate on sides, less convex (5 x 6 mm.) : elytra much more depressed, less roundly and strongly declivous behind (12¼ x 8¼ mm.), the apex narrower ; granules of interstices weaker, less conical, those of third and fifth placed more evidently in a double row. The under-surface differing in the yellowish scales being absent from the middle of the first two ventral segments, and more thinly set on the middle of the last three ; first segment not hollowed in middle ; second longer and convex ; second, third, and fourth without lateral impressions : apical segment with a small round median impression.

Length, 19½ ; breadth, 8¼ mm.

Habitat.—Westward to Everard Range, S.A. May-June, 1891.

Compared with *T. æqualis*, Sl., this species differs by the elytra strongly rounded on the sides and convex longitudinally ; their sculpture more regular, the granules of the interstices being more even and more conical.

From *T. Helmsi*, Sl., it may be distinguished by its less convex form ; and wider elytra, more dilatate on the sides, with the

granules more tuberculiform, giving the dorsal interstices a somewhat serrate appearance posteriorly.

Talaurinus solidus, *n. sp.*

Female.—Head rostrum, prothorax ($5\frac{1}{2}$ x $6\frac{1}{2}$ mm), and under-surface not offering any decided difference from *T. regularis*, female. Elytra ovate (13 x $8\frac{1}{2}$ mm.), widest behind middle, lightly rounded on sides, a little narrowed to base, strongly declivous behind, lightly convex transversely, very lightly so longitudinally; disc rather depressed, base lightly emarginate; shoulders advanced in a thick prominent tubercle; dorsal interstices closely-set for whole length with setigerous granules, these becoming tuberculiform on posterior declivity; granules of first interstice small, round, evenly placed, of second and fourth larger than those of other interstices, of third placed in a double row, except near apex, of fifth double near middle of length.

Length, 20; breadth, $8\frac{1}{2}$ mm.

Habitat.—Westward to Everard Range. May, June, 1891.

Two female specimens. Closely allied to *T. regularis*, Sl. The following differences may be noted. The elytra more convex, less dilatate on sides, their sculpture more confused; the granules larger, flatter, more unevenly shaped, those of second and fourth interstices decidedly larger than those of others; fifth and sixth interstices almost straight, not deflexed posteriorly. In *T. regularis* the fifth interstice displays a decided convexity in its course, and the course of the sixth is also lightly convex.

Talaurinus Helmsi, *n. sp.*

Oblong-elliptical, subparallel; prothorax granulate; elytra striate, the interstices granulate. Black, the granules shining; the spaces between the granules sparingly filled with fine cinereous scales, these thicker on elytra and forming a stripe along their margin; head with darker scales, a few cinereous scales in middle and on each side above eyes; under-surface with a vitta of cinereous scales (not hair) down middle.

Rostrum short, excavate, without internal ridges, transversely impressed at base between external ridges, these setigero-punctate. Head broad, convex; occiput clothed with a thick velvety pile; front with short decumbent setæ. Antennæ long, slender.

Male.—Prothorax rather narrow ($4\frac{1}{2}$ x 5 mm.), lightly dilatate on sides, widest rather before the middle, lightly convex transversely, hardly at all so longitudinally; anterior margin strongly sinuate, middle rounded, but hardly projecting above head; base truncate; granules unequal, round, separate, unisetigerous, extending on sides to near coxæ. Elytra oval (11 x $6\frac{3}{4}$ mm.), widest rather behind middle, a little narrowed to shoulders, very

declivous behind; sides subparallel; base subcircularly emarginate; shoulders projecting forward in a short, thick, truncate tubercle; apex rounded, without sinuosity or projections near suture; striæ very uneven, having along their course very small setigerous granules; dorsal interstices regular, formed of separate large shining unisetigerous granules, these becoming more prominent and conical on posterior-half of elytra. Metasternum flat. First ventral segment lightly and widely hollowed in middle; second flat in middle; apical segment longer than two preceding ones together, deeply and subcircularly excavate, the excavation regular, without sinuosities or rugosities, sparingly clothed with short erect setæ; apex of pygidium thick, lightly emarginate; a short tuft of reddish hair on each side of the anal aperture.

Length, 16½; breadth, 11 mm.

Female.—Differing from male in having the prothorax wider and less narrowed to base; the elytra more parallel, less dilatate on sides, less roundly declivous and more flattened behind. Under-surface differing from male as in *T. regularis*, Sl.

Length, 16½; breadth, 11 mm.

Its narrower form, greater convexity, and the less conical granules of the elytra, serve to distinguish it from *T. regularis*; while its smaller size, and the less parallel and more convex form of its elytra readily separate it from *T. æqualis*, Sl. From *T. solidus*, Sl., its smaller size, narrower and more convex form, and the stronger and more regular granulation of the interstices of the elytra, together with the fewer scales of the dorsal surface, help to distinguish it.

Habitat.—Everard Range, &c., May-June.

Talaurinus æqualis, *n. sp.*

Oblong, subparallel, elytra flattened on disc; prothorax granulate; elytra striate, the interstices granulate. Black, the granules shining; spaces between the granules on prothorax without scales, on elytra sparsely filled with fine cinereous scales, these thickly-set and forming a stripe along anterior part of lateral margin; under-surface with cinerous scales down middle of ventral segments.

Rostrum short, excavate, without internal ridges, transversely impressed at base between external ridges, these setigero-punctate. Head broad, convex; front with short decumbent setæ; occiput with fuscous scales along margin of prothorax.

Male.—Prothorax a little broader than long (4 x 5½ mm.), lightly convex transversely, lightly rounded on sides, widest before the middle; disc hardly at all convex longitudinally; anterior margin strongly sinuate, middle rounded and projecting

very lightly above head; base truncate; granules closely placed, round, unequal, separate, unisetigerous, extending on sides to near coxæ. Elytra oval ($11\frac{1}{2}$ x $7\frac{1}{2}$ mm.), subparallel (lighted rounded) on sides, widest a little behind middle, very little narrowed to shoulders, strongly declivous behind; disc depressed hardly convex transversely, and not at all so longitudinally; base lightly emarginate; the shoulders advanced in a strong subtruncate tuberculiform projection; apex wide, without sinuosity or projections near suture; dorsal striæ formed of numerous depressions with a small setigerous granule between each; dorsal interstices closely-set with small setigerous tubercles becoming stronger and more conical towards apex; tubercles of second and fourth insterstices stronger and wider apart, those of third more confused. Ventral segments with lateral impressions almost obsolete; first segment flat, hardly the least hollowed-out between posterior coxæ; second flat; apical segment a little longer than two preceding ones together, deeply excavate, the excavation extending for full length of segment, parallel sided, evenly and regularly rounded at bottom; the posterior lateral tufts of reddish hair weakly developed. Legs light; femora cylindrical, anterior without a ridge on lower side.

Length, 18; breadth, $7\frac{1}{2}$ mm.

Female.—Only differing from the male by having the elytra flatter with less marked sculpture. The apical ventral segment with a large round foveiform excavation in the middle (prothorax, 5 x $5\frac{3}{4}$ mm.; elytra, 12 x 8 mm.).

Length, 19; breadth, 8 mm.

This species differs from *T. regularis*, Sl., by its more elongate and depressed form, and by the elytra in both sexes being far less dilatate on the sides. The granules on the interstices of the elytra are not tuberculiform, except towards the apex, and then far less strongly so than in *T. regularis*. From *T. Helmsi*, Sl., its much flatter dorsal surface, larger size, and less regularly sculptured elytra readily distinguish it. Compared with *T. solidus*, Sl., it is of lighter and more parallel form, with flatter and more regularly sculptured elytra, and with hardly any scales on the dorsal surface.

Talaurinus crassiceps, *n. sp.*

Male.—Elongate, narrow; head (with rostrum) short and thick; prothorax short, thickly granulate; elytra foveo-striate, the interstices finely granulate; legs very long and light. Black, cavities of prothorax and elytra thickly-set with cinerous scales; sides of jaws, head, prothorax, and elytra, together with the metasternum and sides of ventral segments, sprinkled with white scales; femora covered with white scales, becoming very thick

towards apex; tibiæ (excepting lower side) and upper side of tarsi thickly-set with whitish scales; legs and ventral segments setigerous, the setæ black, very closely placed, but not forming a "vitta," in middle of ventral segments.

Rostrum short, thick (as thick in front as the head), scarcely emarginate and without a triangular lamina at apex, almost flat, only excavate towards apex, lightly tri-impressed at base, with a short linear median impression and a wide shallow one on each side; external ridges short, not elevated, continuous with front, sides of rostrum roundly convex below antennæ; gular emargination without a median projection. Head thick, convex, whole upper-surface and external ridges of rostrum rather thickly setigerous; occiput thickly-set with pilose scales. Prothorax transverse ($3\frac{1}{3}$ x $4\frac{3}{4}$ mm.), not dilatate on sides, widest rather before the middle, very little narrowed in front, decidedly and rather roundly narrowed behind, wider across apex than across base; disc transversely subconvex, not longitudinally convex; anterior margin strongly sinuate, middle rounded, but not projecting above head; ocular lobes very prominent; base truncate; granules strong, thickly set, unisetigerous, obsolete on sides near coxæ. Elytra oval ($9\frac{1}{2}$ x $5\frac{1}{2}$ mm), wider than prothorax, widest about middle, evenly rounded on sides, narrowed to base, declivous behind; disc depressed, convex towards sides, hardly so longitudinally; base very lightly emarginate; shoulders marked by a strong but not very prominent tubercle; apex evenly rounded, without sinuosity or projections near suture; striæ formed of close shallow foveæ; interstices narrow, not elevated, closely-set with small setigerous granules. Apical-ventral segment not as long as two preceding ones together, not excavate. Anterior femora cylindrical, very little thickened before the middle; lower side without a ridge.

Length, 15; breadth, $5\frac{1}{2}$ mm.

Habitat.—Barrow Range.

I know of no species allied to this; its very short thick rostrum, hardly the least excavate and with weak scrobes, separates it from all the species of *Talaurinus* known to me. The late Sir William Macleay would probably have placed it in his "granulate" group.

Talaurinus obscurus, *n. sp.*

Female.—Oblong, robust; head and rostrum large, setigero-punctate; prothorax subcylindrical, coarsely granulate; elytra substriate, the interstices roughly granulate, the granulations setigerous, a few fine setæ in the striæ. Black, shining; forehead with a light vitta of griseous scales down the middle, bifurcating and the scales becoming whiter on the rostrum. Specimen

before me without other scales, excepting a ventral median vitta of short yellowish-brown scales reaching from middle of first segment to apex; this vitta narrow and very weak on first two segments, wider and continuous on last three.

Rostrum broad, thick, as wide across apex as head, lightly excavate; middle part broad, not raised into a ridge; a broad horseshoe-like impression at base, subfoveate and extending obliquely forward on each side; external ridges convex, continuous with forehead. Head broad; front depressed and lightly concave in middle behind rostrum. Prothorax a little broader than long ($5\frac{3}{4}$ x $6\frac{1}{2}$ mm.), subcylindrical, dilatate on sides, broadest before the middle, as broad across apex as across base, not convex longitudinally; disc depressed; anterior margin sinuate, truncate above head; base truncate; granules large, unequal, flattened, unisetigerous; sides lightly rugulose near coxæ; a narrow space along anterior margin rather roughly setigero-punctate. Elytra heavy, suboval (15 x $8\frac{1}{2}$ mm.), widest about middle, strongly rounded on sides, decidedly narrowed to base and apex, transversely and longitudinally convex; middle of disc depressed; base lightly emarginate; shoulders a little advanced in a strong obtuse prominence; apex with a strong triangular projection at end of second interstice of each elytron, the emarginations between these projections broad, shallow, not triangular; sculpture formed of elevations and depressions: the elevations rather regular, forming subgranulate interstices, not prominent on anterior two-thirds of elytra: the depressions irregular; posterior declivity with more regular sculpture than disc, the interstice having regular tuberculiform granules; sculpture of sides irregular, with deep transverse rugæ. Ventral segments, excepting first, impressed on sides: the impressions of third and fourth confluent, and together forming a deep fovea not extending to posterior margin of fourth; apical segment as long as two preceding ones together, not excavate towards apex.

Length, $23\frac{1}{2}$; breadth, $8\frac{1}{2}$ mm.

Habitat. -Westward to Everard Range. May-June.

This species seems more allied to *T. concavus*, Sl., than to *T. insignis*, Sl., or *T. noctis*, Sl. The differences in the rostrum, forehead, sculpture of the elytra, and the much weaker ocular lobes, &c., preclude me from thinking there can be any possibility of its being the female of *T. concavus*.

Talaurinus noctis, *n. sp.*

Female.—Oblong, robust; head broad, smooth; prothorax granulate; elytra longitudinally very convex, subfoveo-striate (the sculpture intricate), legs light. Black, shining; prothorax and elytra without scales, except some whitish ones near margin

of elytra; under-surface with a few scattered black setæ, a patch of yellowish scales on middle of anterior part of three last ventral segments.

Rostrum broad, short, not concave; the middle rather flat; external ridges diverging in front, flattened; a short deep oblique impression on each side of base, lightly connected behind, and forming a horseshoe-shaped impression. Head broad, thick, convex; front a little flattened behind rostrum. Antennæ slender; the scape very little thickened to apex. Prothorax broader than long ($5\frac{1}{2}$ x $6\frac{1}{2}$ mm.), dilatate on sides, widest before the middle, as wide across apex as across base, lightly convex transversely, not convex longitudinally; disc depressed: anterior margin strongly sinuate: middle not projecting above head; base truncate; granules large, unequal, rather flat, separate, uni-setigerous (the setæ black and small); sides granulate, and rough to the coxæ; a narrow space along anterior margin free from granules, setigero-punctate, and declivous. Elytra oval (14 x $5\frac{3}{4}$ mm.), widest about middle, transversely and longitudinally convex; disc not flattened; base hardly emarginate; shoulders advanced in a strong, obtusely conical projection; apex without sinuosity or projections near suture; sculpture formed of sub-foveiform depressions and irregular transverse wrinkles separated by intervals, these depressions and intervals arranged in longitudinal lines, and forming striæ and interstices; the sculpture more regular behind and on sides; striæ deep, uneven, the course of two next suture interrupted and confused, three next more even; first three interstices indeterminate and commingled, fourth hardly separated from them, fifth and sixth consisting of closely-set regular elevations; the surface of the elytra sparsely sprinkled with fine black setæ. Three last ventral segments wrinkled at the sides; apical segment not as long as two preceding ones together, a deep narrow fovea at apex.

Length, 22; breadth, $7\frac{3}{4}$ mm.

Habitat.—

This species differs conspicuously from *T. obscurus*, Sl., female, in having the elytra very convex longitudinally, and without projections or sinuosity at apex, &c., &c. It may be possible that *T. noctis* is the female of *T. insignis*, Sl., but I do not think there is any reasonable probability of such proving to be the case; however, until both sexes of this or some closely allied Amycterid are known, it is impossible to speak with certainty of the sexual differences in this group of *Talaurinus*. The differences from the male of *T. conversus*, Sl., are too decided for there to be any possibility of its being the female of that species.

Talaurinus insignis, *n. sp.*

Male.—Elongate, subparallel; prothorax very dilatate on sides, granulate; elytra foveo-striate; legs long; antennæ slender.

Black, shining; a few greyish scales in some of the foveæ of the elytra, and a discontinuous stripe of grey scales along their lateral margins. Ventral segments longitudinally impressed on each side, and having a median vitta of thick, bristly, black hair.

Rostrum short, broad, lightly excavate, without internal ridges; the middle a little raised, smooth, and longitudinally convex; a short deep fovea extending obliquely forward on each side of base, these foveæ connected behind by a transverse impression; external ridges setigero-punctate, not divided from forehead, prominent, diverging a little in front of antennæ. Head convex, setigero-punctate between the eyes; front lightly excavate, and strongly declivous to middle of rostrum.

Prothorax a little broader than long (6 x 6⅓ mm.), strongly dilatate on sides, widest before the middle, about as wide across apex as across base, lightly convex transversely, a little so longitudinally; disc flattened; anterior margin strongly sinuate, middle lightly advanced, but not produced over head; ocular lobes prominent; base truncate; granules large, unequal, flattened, more prominent near sides, not extending to near coxæ; the sides rugulose and setigerous near coxæ; a narrow declivous space along anterior margin free from granules and setigerous. Elytra long, narrow (14 x 7 mm.), depressed on disc, lightly declivous behind; base broadly and lightly emarginate; the shoulders projecting forward in a thick rounded tubercle; apex rounded, the edges of suture becoming very lightly dehiscent at apex, and ending in small blunt prominences; dorsal interstices subcostate, very slightly raised, forming broken discontinuous ridges, becoming rather tuberculate on posterior declivity, third most prominent and reaching almost to apex; the spaces between the interstices of dorsal surface foveate; the foveæ irregular, often confluent, and crossing the interstices; the sculpture of the sides more regular, formed of alternate transverse undulate ridges and depressions so disposed as to make regular longitudinal striæ with subgranulate interstices; the suture in a shallow longitudinal channel. Ventral segments longitudinally impressed on each side of median vitta, the impressions continuous on first and second segments, interrupted on third, extending across last two, and forming a deep oblique fovea on last; apical segment not as long as two preceding ones together. Legs long; anterior femora dilatate in middle, a longitudinal linear cicatrix on lower side of apical half;* posterior tarsi long, narrow; ungues long.

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* A more or less prominent longitudinal ridge is found in the middle of the apical part of the femora in many species of *Talaurinus* and *Sclerorhinus*. Though apparently overlooked by former writers, it will probably be found of great use in grouping the species of these genera. It is essentially a characteristic of the male

Length, 23 ; breadth, 7 mm.

Habitat. —

I cannot compare this species with any previously described species. From *T. concavus*, Sl., its more elongate form and the flattened elytra are sufficient to distinguish it at a glance. *T. obscurus*, Sl., and *T. noctis*, Sl., are founded on female specimens, and comparisons between different species of *Amycteridæ*, not of the same sex, are apt only to mislead.

Talaurinus convexus, *n. sp.*

This species from the McDonnell Ranges in Central Australia, though not one of the Amycterides of the Elder Exploring Expedition, may be very appropriately described here, as being closely allied to the preceding three species and adding another to the isolated group they form in the genus *Talaurinus*. It is represented in my collection by a single example.

Male. —Oblong-elliptical, convex ; prothorax coarsely granulate on disc ; elytra longitudinally convex, foveo-striate. Black ; a faint median vitta of griseous scales on forehead, bifurcating on rostrum ; a few griseous scales near eyes ; prothorax without scales, excepting a small patch of griseous scales in middle of vertical part of each side, and another similar patch of scales near each basal angle ; disc of elytra almost free from scales, a few in some of the foveæ, the scales more plentiful on posterior declivity, a discontinuous stripe of greyish scales along lateral margins. Ventral segments with a narrow vitta of thick, bristly, fuscous hair.

Rostrum short, excavate, without internal ridges ; the middle smooth, not raised ; a deep, broad, transverse impression at base ; external ridges not divided from forehead, lightly convex, diverging slightly in front. Head not large ; front depressed in middle, and lightly excavate behind rostrum. Prothorax broader than long ($5\frac{3}{4}$ x $6\frac{1}{2}$ mm.), dilatate on sides, broadest before the middle, wider across base than across apex, transversely convex, hardly so longitudinally, but declivous in middle to anterior and posterior margins ; anterior margin strongly sinuate, middle lightly advanced and rounded above head ; base truncate ; granules unequal, much larger on disc than on sides, separate, unisetigerous, a few smaller ones extending to near coxæ ; a narrow longitudinal median line dividing the granules on posterior-half ; a light transverse impression across anterior part, more clearly defined and nearer margin behind each post-ocular sinuation ; an obsolete longitudinal impression on each side, becoming well marked near each basal angle. Elytra oval ($14\frac{1}{2}$ x $7\frac{1}{2}$ mm.), lightly rounded on sides, widest about middle, transversely and longitudinally convex ; disc not flattened ; base

lightly emarginate; shoulders advanced in a strong obtuse tuberculiform projection; apex rounded, without sinuosity or projections near suture; sculpture regular, formed of foveate striæ and subgranulate interstices; granulations of interstices conical on posterior declivity, those of third interstice most prominent and almost reaching to apex; sculpture of sides weak after sixth *(infra-humeral)* interstice. Ventral segments longitudinally impressed on each side of median vitta as in *T. insignis*: apical segment not as long as two preceding ones together. Legs of ordinary proportions; anterior femora shorter, and less dilatate in middle than in *T. insignis*: cicatrix of apical part of lower side short and weak.

Length, $22\frac{1}{2}$; breadth, $7\frac{1}{2}$ mm.

Sclerorhinus Elderi, *n. sp.*

Oblong, convex; prothorax granulate, striate-tuberculate. Black, head and dorsal parts of prothorax and elytra thinly covered with scales of brownish-grey colour (these scales much thicker on elytra): the scales on lower parts of sides of prothorax and elytra cinereous, and placed in cavities, those of elytra forming an interrupted marginal stripe; tubercles, granules, and elevations shining; a median vitta on under-surface, this vitta in male continuous from mesosternum to apex, narrow, formed of blackish-brown velvety pile; in female discontinuous, formed (on basal segment of abdomen only) of short griseous hair-like scales.

Rostrum short, wide, hardly narrower than head, lightly emarginate in front, lightly impressed at each side of base of central ridge, which is broad, smooth, very slightly raised, not extending to forehead; external ridges hardly diverging in front, finely setigero-punctate. Head rather flattened on sides; occiput convex; front a little flattened and gently declivous to middle of rostrum.

Male. Prothorax not much wider than long (6 x $6\frac{3}{4}$ mm.), dilatate on sides, broadest before the middle, shortly and roundly narrowed in front, gently narrowed behind; anterior margin sinuate, truncate between ocular lobes; base truncate; granules large, unisetigerous; sides near coxæ rugulose, not granulate. Elytra oval, narrow ($14\frac{1}{2}$ x $7\frac{1}{2}$ mm.), wider than prothorax, widest rather behind middle, a little narrowed to base; sides lightly rounded; base truncate; apex widely rounded, without sinuosity or projections near suture; dorsal surface not flattened, convex transversely and longitudinally; five rows of strong closely-placed tubercles on each elytron, the fourth (the humeral one) beginning at the shoulder in a strong subconical projecting tubercle; the tubercles rather flatter on dorsal surface, rounder

and conical on posterior declivity; a row of granules (stronger and closer near the base) on each side of the suture (the first and third rows of tubercles hardly extend on the posterior declivity, the second extends almost to the apex, the fourth and fifth hardly so far). Ventral segments strongly divided, impressed, slightly rugulose, and almost glabrous on each side of median vitta; apical segment not as long as two preceding ones together, the impression on each side of the median vitta deepest towards the front, not extending in full depth to either anterior or posterior margin. Legs sparsely setigerous; femora cylindrical; anterior thickened in middle, lower side with a narrow cicatrix-like ridge on apical half; anterior tibiæ sinuate and setigerous on lower side, the apex bent inwards in a single strong triangular projection.

Length, $22\frac{1}{2}$; breadth, $7\frac{1}{2}$.

Habitat. --Everard Range.

Female.—Larger and proportionately wider than male; prothorax ($6\frac{1}{2}$ x $7\frac{1}{2}$ mm.) wider across base, less dilatate on sides; elytra ($15\frac{1}{2}$ x 9 mm.) more rounded on sides, with a small triangular sutural notch at apex; anterior femora much less thickened in the middle, the cicatrix of lower side obsolete; three last ventral segments with light rugulose impressions on each side (these impressions long, narrow, and oblique on apical segment); apical ventral segment with a narrow parallel-sided median excavation at apex.

Length, 24; breadth, 9 mm.

This species must be allied to *S. laticollis*, Macl. (the type of which from Sir William Macleay's description seems to be the male), the most apparent differences between it and that species seem- the elytra broader than the prothorax in the male, and the upper-surface not free from scales in *S. Elderi*.

Sclerorhinus occidentalis, *n. sp.*

Robust, elliptical; prothorax dilatate on sides, granulate; elytra with rows of red tuberculiform granules. Black, elytra very thickly covered with short cinereous-brown scales; a narrow median vitta of thick tawny hair extending on under-surface from mesosternum to apex.

Rostrum short, about as wide as head, considerably dilatate on sides below antennæ; external ridges parallel, convex in profile; central ridge broad, prominent, hardly divided from forehead. Head with front flattened and lightly impressed longitudinally behind the sulci of the rostrum. Head and rostrum with two vittæ of yellowish scales, sides of head with yellowish scales.

Male. –Prothorax broader than long (7 x 8 mm.), very dilatate on sides, widest before the middle, transversely and longitudinally convex; disc greatly depressed; anterior margin strongly sinuate,

the middle projecting lightly over the head: base truncate; an elongate triangular impression in front of each basal angle, a less distinct impression near each anterior angle (these impressions not meeting); median line well-marked only on disc; granules closely-set, separate, unequal, depressed, unisetigerous, obsolete on sides near coxæ. Elytra heavy, not wider than prothorax (15·5 x 8 mm.), rounded on sides, widest rather behind the middle, transversely convex; disc lightly convex longitudinally; posterior declivity rather strongly declivous; base broad, roundly emarginate; shoulder projecting in a strong obtuse prominence; apex widely rounded, without sinuosity or projection near suture, the edge very thick and prominent on each side; six rows of tubercles on each elytron: first very short, oblique, only noticeable near scutellum: second, fourth, and sixth rows not extending to base or apex: second consisting of eleven or twelve separately, but not widely-placed, small round tubercles: fourth of eight similar tubercles, not extending on to posterior declivity: sixth of much more closely placed stronger and more conical tubercles (sixteen or seventeen), extending nearer to both base and apex than those of second and fourth rows: third and fifth (humeral row) consisting of closely-placed tubercles (twenty-one to twenty-six in a row) extending from base to near apex; the tubercles more prominent behind, conical on posterior declivity; a row of fine black setæ between each row of tubercles. Ventral segments rather strongly impressed on each side of median vitta; a strong, narrow, oblique impression between first and second segments; apical segment not as long as two preceding ones together, and having the impression on each side of the median vitta deep, narrow, and parallel. Legs moderate; femora subgranulate, cylindrical; anterior dilatate in middle, arcuate on upper-side, lower-side with a long, narrow, straight, cicatrix-like ridge on anterior two-thirds; tibiæ rather strong; four posterior ones with a few short spines on inner side; anterior with two or three widely-placed dentiform tubercles on lower-side, apex bent broadly inwards, the anterior part of the projection prominent and acute.

Length, 24; breadth, 8 mm.

Female.—Differs from the male in the much less dilatate and less convex prothorax (7·25 x 8·25), the granules larger and more prominent, the lateral impression of the disc continuous from base to apex, the spaces between the tubercles filled with scales. The elytra broader (16·25 x 10 mm.), more rounded on the sides, posterior declivity a little more abrupt, the apical margin with a small triangular sutural emargination; the tubercles larger and less prominent, the second and fourth rows with fewer tubercles (only four widely placed ones in the fourth)

The median vitta of the under-surface much weaker, formed of yellowish scales and short hairs. Only the three apical ventral segments laterally impressed, the impressions almost continuous and diverging a little in front, the apical segment rugulose in middle and with a narrow transverse impression near extremity between the lateral impressions. Anterior femora without a ridge on lower side; the inturned apical projection of anterior tibiæ larger and more conspicuous.

Length, 25; breadth, 8·25 mm.

Habitat—Upper Murchison.

This species seems most closely allied to *S. molestus*, Pasc., among previously described species. My collection contains a female specimen from some part of South Australia, which is evidently *S. molestus*, Pasc.; compared with it, *S. occidentalis* is much less convex on both prothorax and elytra, has the tubercles of the elytra red (not black), and much less conical and strong on the apical half. It may also come near *S. laticollis*, Macl., but, I think, from there being nothing to the contrary in the description of *S. laticollis*, the tubercles must be placed in that species equally in all the rows, as in *S. Elderi*, Sl.; besides the present species seems too thickly covered with scales for it to be *S. laticollis*, of which Sir William Macleay says:—"The whole insect is of an almost glossy black, and free from scales."

The male is readily distinguished from the male of *S. angustipennis*, Sl., by its wide rostrum with the external ridges not convex in profile; the more convex prothorax with much larger but less prominent granules, the sides of the prothorax apparently more dilatate, with the middle projecting more sharply out from the lateral parts above the coxæ; the broader elytra more strongly rounded on the sides, the shoulders forming a large blunt projection, not a tubercle, the apex widely rounded with the edge thick and prominent on each side, the tubercles of the second and fourth rows, &c., more numerous and more closely set.

Among the Amycterides of the Elder Expedition there was only a single female of this species. I am indebted to the Rev. Thomas Blackburn for the loan of the male specimen described above, which is in his collection as coming from West Australia.

Sclerorhinus angustipennis, *n. sp.*

Male.—Elongate, convex; prothorax dilatate, finely granulate; elytra narrow, with rows of red tuberculiform granules. Piceous-black; head, prothorax, and elytra covered with ferruginous scales, these very close all over elytra (except where rubbed-off sides by femora), giving them a rusty appearance; a narrow median vitta of thick tawny hair extending on under-surface from mesosternum to apex.

Rostrum short, a little narrower than head, very little widened on sides below antennæ; external ridges almost parallel: central ridge short, narrow, prominent, not extending to forehead. Head convex, not flattened on sides; front a little flattened and very lightly declivous to middle of rostrum. Prothorax a little broader than long (7 x 7·5 mm.), very dilatate on sides, widest before middle, transversely and longitudinally convex; middle of disc rather flat; anterior margin sinuate, the middle projecting slightly over the head; base truncate; an obsolete transverse impression across the anterior part: longitudinal impressions of sides obsolete; median line very fine; granules closely-set, separate, small, round, unequal, unisetigerous, obsolete on sides near coxæ. Elytra long, narrow, not wider than prothorax (14·5 x 7·5 mm.), very lightly rounded on sides, widest about middle, tapering to apex, transversely convex; disc very lightly longitudinally convex; posterior declivity gently declivous; base lightly and roundly emarginate; a strong blunt tubercle at shoulders; apex rounded, without sinuosity or projections near suture; six rows of tubercles on each elytron: first short, oblique, only present near scutellum: second and fourth not extending to base or to posterior declivity: second consisting of five widely-placed granuliform tubercles: fourth of three similar ones: third and fifth (humeral row) consisting of closely-placed tubercles (twenty to twenty-five in a row) extending from base to near apex and becoming wider apart and more conical on posterior declivity; tubercles of sixth stronger than those of other rows, and not extending to base or apex; a row of very fine granules bearing short decumbent setæ between each row of tubercles; ventral segments as in *S. occidentalis*, Sl. (male). Legs long; femora subgranulate, cylindrical; anterior very dilatate in middle, very arcuate on upper side, lower sides with a long, narrow, straight, cicatrix-like ridge on anterior two-thirds: tibiæ slender, four posterior ones with a few short spines on inner side: anterior with two or three widely-placed dentiform tubercles on lower side, and with apex bent inwards in a broad bifid projection.

Length, 22·5; breadth, 7·5 mm.

Habitat.—Fraser Range.

A single specimen. It is very closely allied to *S. occidentalis*, Sl. For the same reasons as given under that species I have not thought it possible for it to be *S. laticollis*, Macl.

Molochtus tibialis, *n. sp.*

Male.—Oblong-elliptical, disc of prothorax and elytra depressed; head and rostrum narrow; prothorax subquadrate, closely granulate; elytra subtriate, the interstices irregular. Black, opaque, without scales.

Rostrum short, about same width as head, deeply excavate, divided from front by a linear impression ; external ridges short, prominent, strongly punctate, very lightly divergent in front, connected behind by a curved ridge. Head small, much narrower than prothorax, convex behind ; front smooth, sparsely and finely punctulate ; anterior margin very lightly emarginate; each side elevated into a short convex ridge in a line with, and just behind, the external ridges of rostrum (these ridges raised above the plane of the external ridges). Prothorax subquadrate (5·5 x 5·75 mm.), widest about middle, truncate in front and behind, flat on disc, very declivous behind, very lightly declivous from middle of anterior part of disc to anterior transverse impression ; sides very lightly rounded in middle, gently but decidedly narrowed in front, shortly narrowed behind ; a narrow linear transverse impression a little behind anterior margin ; two small prominent conical tubercles on each side, one placed where the sides begin to narrow in front, the other (larger and more prominent) in a corresponding position behind : another tubercle, about equal in size to the latter, placed on each side above the basal declivity—the space between these wide and concave; granules strong, small, well-defined, very closely set, rather diamond-shaped, punctured at apex, but not setigerous. Elytra a little wider than prothorax (12 x 7 mm.), subparallel, very lightly rounded on sides, widest about middle ; disc flattened, posterior declivity abrupt ; base truncate ; apex with a very short triangular projection on each side of suture, the emargination between these light triangular ; a strong conical tubercle at each shoulder, and another similar, but much smaller, on base at half the width of each elytron ; sculpture rather regular ; the striæ sub-foveate, seven granulate striæ on each elytron, those on disc with the granulations, especially towards the suture, confluent and divided by wavy transverse depressions ; others stronger, more regularly granulate ; the granules becoming more prominent and conical behind ; numerous shallow punctures without setæ dispersed over elytra. Metasternum flat, thickly covered with minute granules. Ventral segments strongly divided, not setigerous; first and anterior-half of second minutely granulate ; last three and posterior part of second coarsely punctate ; apical segment as long as two preceding ones together, lightly impressed towards apex ; second segment lightly and widely hollowed between the coxæ. Legs long ; anterior tibiæ with external edge strongly arcuate near apex, inner side with a deep short emargination before apex, apex produced inwards in a broad strong projection.

Length, 18·5 ; breadth, 7 mm.

Habitat.—Fraser Range.

Female, compared with male, larger, broader, and flatter. Pro-

thorax (6 x 6·5 mm.) flatter, more strongly granulate; three strong lateral tubercles on each side, two of these as in male, the third smaller and placed a little in front of the one where the sides begin to narrow in front. (There are faint indications of this tubercle in the male.) Elytra more robust, greatly wider than prothorax (16 x 9·5 mm.), more evenly and strongly sculptured; the triangular notch at apex much deeper, the projections on each side of it more prominent; second ventral segment not hollowed between coxæ; apical segment with edge a little upturned round apex. Legs shorter; anterior tibiæ less arcuate on external edge, and without the broad inward projection and ante-apical notch of lower side.

Length, 25; breadth, 9·5 mm.

When in Sydney I was able, through the kindness of Mr. Masters, to compare *M. tibialis* with a specimen (evidently a female) of *M. gagates*, Pasc., received by him from Mr. Pascoe. I would note the following differences: —*M. tibialis* has the rostrum more deeply excavate, with longer and more prominent external ridges, the front with a strong prominence on each side behind the external ridges of the rostrum (in *M. gagates* these prominences are obsolete); the prothorax flatter, with the large tubercles more strongly developed, excepting the two on the base, which in *M. gagates* equal those near the basal angles; the granules more prominent, more numerous, and more clearly defined; the elytra flatter, and somewhat differently sculptured, the granules being in rows, separated by wavy interrupted striæ. (In *M. gagates* the sculpture is rougher and more confused, with the transverse impressions deeper.

This species seems to have an extensive range, the male is labelled "Fraser Range, October," the female "May-June" (westward to Everard Range).

Acantholophus granulatus, *n. sp.*

Of elongate elliptical form; elytra much wider than prothorax; dorsal surface of prothorax flat, tuberculate, with lateral margins dentate; elytra striate, the interstices closely granulate. Black, with cinereous scales; the scales whiter, and sparsely placed on sides of rostrum, prothorax, and elytra, very thinly scattered among the cavities on disc of prothorax, thicker on middle of posterior part, set in thick patches on the dorsal surface and apical declivity of elytra, giving the elytra a mottled ashen appearance.

Rostrum short, about as wide as head, very deeply excavate; external ridges rugulose, setigerous, very much elevated, as high behind as in front, cut obliquely to apex of scrobe in front, separated from frontal crest by an oblique gap; a transverse im-

pression at base, bifurcating at sides, the anterior branch forming the gap between the external ridges and frontal crests, the posterior branch extending on to these latter. Head flat and rugulose in front; frontal crests narrow, very elevated, obliquely truncate at summit. Prothorax almost as long as broad (4 x 4·25 mm.), truncate in front and behind; dorsal surface flat, strongly and very closely tuberculate; median line lightly marked; a strongly marked narrow transverse impression near anterior margin, and another near base; lateral margins produced and quadridentate between these impressions (third projecting tubercle of side very small); vertical part of sides convex, lightly rugulose; a dentiform tubercle on each side of the disc in front of anterior transverse line, and a strong conical tubercle on each side of median line near base. Elytra oval (10 x 6·25 mm.), evenly rounded on sides, perpendicularly declivous behind; base truncate between shoulders, gently but greatly declivous to pedunele; apex widely rounded; the elytra lightly dehiscent at suture, and each ending in a short triangular projection; disc depressed, but slightly convex transversely and longitudinally; striæ continuous, a little uneven; first seven interstices with a row of small very closely-set regular setigerous granules (these rows having a tendency to become double on parts of first three interstices); the granules of fifth and sixth interstices near the base, and of all the insterstices on posterior part, becoming tuberculiform; a rather strong tubercle at each shoulder at beginning of fifth interstice. Tarsi broad, short.

Length, 16·5; breadth, 6·25 mm.

Habitat. –Barrow Range, Central Australia (August, 1891).

There is only a single example of this well marked species: unfortunately the abdomen is broken, so that I have been unable to ascertain the sex, though I believe it to be the male. I know of no species that is closely allied to this; in the shape of both rostrum and forehead, it shows a relationship to the genus *Molochtus*, which its author, Mr. Pascoe, thought more allied to *Talaurinus*. In this I do not agree, for it seems to me the affinities of *Molochtus* are more to *Acantholophus* and *Cubicorhynchus*.

Cubicorhynchus occultus, *n. sp.*

Oblong, convex; prothorax granulate; elytra striate, the interstices granulate; anterior coxæ not contiguous. Black with cinereous scales.

Rostrum short. Head convex behind; front flat, a few faintly marked rugosities towards vertex; frontal crests not prominent, continuous with, but a little more raised than, external ridges of rostrum, truncate behind, conical at apex.

Male.—Prothorax a little broader than long (4 x 4½ mm.),

truncate in front and behind; strongly and almost vertically declivous to peduncle; sides roundly dilatate, more shortly rounded in front than behind; disc rather depressed, slightly convex transversely and longitudinally; a strongly-impressed line a little behind anterior margin (causing the anterior margin to be completely girdled by a convex *collar*); median line very lightly marked; small separate unisetigerous granules rather thickly placed all over disc, and on sides about half way to coxæ; space between granulate portion and coxæ smooth. Elytra a little wider than prothorax (8·5 x 5·5 mm.), oval, widest about middle; base rounded with long oblique declivity to peduncle: posterior declivity abrupt; disc rather depressed, lightly convex transversely and longitudinally: seven granulate interstices on each elytron: granules of first interstice weak, of first and second not extending to the posterior declivity, of other interstices becoming stronger towards apex, those of fifth tuberculiform (about three) at commencement of posterior declivity: granules closely and regularly placed, separate not setigerous; brownish cinereous scales rather thinly dispersed all over the elytra. Under-surface thinly sprinkled with pale setæ and scales; first ventral segment concave; second lightly and broadly impressed in middle; apical segment with a very light median impression towards apex. Legs long, light, covered (most thickly towards apex of femora and on tibiæ) with gray scales and setæ; anterior femora cylindrical, narrow and bent near base, thickened on apical half; anterior tibiæ strongly arched, inner edge serrate, the serrations separate and granulate; joints of tarsi squamulose on middle of lower side.

Length, 14; breadth, 5·5 mm.

Female. Compared with male. General form broader and heavier. Head wider. Prothorax proportionately wider (3·75 x 4·5 mm.); disc more depressed; sides less dilatate, a conspicuous small conical granule on each side on anterior of *collar*; the posterior declivity shorter and almost vertical to the peduncle. Elytra much wider (9 x 6·25 mm.), more regularly convex; posterior declivity more gently rounded, and less abrupt; the granules of the interstices more regular, and, though becoming stronger backwards, yet none of them tuberculiform, those of third and fifth interstices equally strong behind. Ventral segments not impressed. Anterior femora not bent near base.

Length, 14·5; breadth, 6·25 mm.

Habitat.—Fraser Range (October 1891).

Cubicorhynchus modestus, *n. sp.*

Female.—Oblong, convex; prothorax strongly granulate; elytra striate, the interstices with setigerous granules anterior

coxæ not contiguous. Black, sparsely sprinkled with brownish scales, the setæ of dorsal surface fulvous.

Rostrum short, flat. Head convex behind; front slightly rugulose, without tubercles; frontal crests prominent, conical. Prothorax broader than long (3 x 3·5 mm.), hardly declivous to peduncle; disc depressed, lightly convex transversely, and very lightly so longitudinally; a transverse impression near anterior margin obsolete on sides; anterior margin with very lightly marked post-ocular sinuations; base truncate, lightly bordered; granules strong, tuberculiform, separate, unisetigerous, more thickly placed on sides of disc than on middle; vertical part of sides granulate rather more than half-way to coxæ, space between granules and coxa smooth. Elytra much wider than prothorax, oval (7·5 x 4·75 mm.), widest about middle, shortly rounded at shoulders; base truncate, declivous to peduncle; posterior declivity abrupt; disc depressed, lightly convex transversely, hardly so longitudinally; seven granulate interstices on each elytron; granules closely and regularly placed, setigerous, those of first and second interstices weak, of third, fourth, and fifth stronger, conical, becoming more prominent towards apex; seventh interstice with only a few granules near shoulder. Under surface shining, sparingly sprinkled with pale separate hairs. Legs as usual in genus; tibiæ ciliate, with rather long fulvous hairs; tarsi without squamulæ on middle of lower side.

Length, 11; breadth, 4·75 mm.

Habitat.—Barrow Range.

The following species, which I regard as *Cubicorhynchus cichlodes*, Pascoe, I consider it to form the type of a new genus, and as Mr. Pascoe's description is very brief, I now offer a more detailed one. As explaining the apparently greater size of the present example as compared with Mr. Pascoe's figures, it may be remarked that his measurement (length only) is exclusive of the rostrum; excluding the rostrum the example before me is five lines long, or only half a line more than Mr. Pascoe gives.

Notonophes, *n. gen.*

Allied to *Talaurinus*. Form oval, robust. *Rostrum* broad, flat, not divided from head; a light, linear, longitudinal impression in middle; external ridges prolonged backwards to eyes, becoming more prominent behind; scrobes widening backwards and reaching the eyes. *Eyes* transversely oval. A large deep fovea on lower side of throat. *Antennæ* robust; scape about half the length, light, slender at base, gradually thicker to apex; joints of funicle short, thick, cylindrical, setose: two first about equal, a little longer than others: third shorter: fourth, fifth, and sixth still shorter, equal; club about as long as three preceding

joints together, thick, hardly incrassate. *Prothorax* short, sparingly-set with round, prominent, shining, unisetigerous granules; base closely applied to elytra; anterior margin lightly sinuate. *Elytra* broad, substriate. Three last ventral segments strongly divided; apical segment not longer than two preceding ones together. *Legs* light, short; anterior coxæ contiguous; tarsi short.

Except for the head the species on which this genus is founded has entirely the form of a *Talaurinus*. I see no reason for regarding the single specimen before me as different from *Cubicorhynchus cichlodes*, Pascoe, though the head seems less convex in profile than is shown in the drawing of the head of Mr. Pascoe's species. It has no close affinity to any Amycterid known to me. Mr. Pascoe says *C. cichlodes* res mbles *Talaurinus cricetus*, but he does not attribute that species to any author, nor have I ever seen any reference to such a species exeept this of Mr. Pascoe.

Notonophes cichlodes, *Pasc.*

Cubicorhynchus cichlodes, Pasc., Journ. Linn. Soc., XII., 1873, p. 18.

Oval, robust, convex; prothorax transverse, granulate; elytra convex, substriate, the interstices granulate. Black; a large patch of yellowish scales on each side of rostrum below the scrobes; upper-surface of head, excepting a narrow space in middle and the anterior part of the rostrum, thickly covered with yellowish scales; prothorax thickly covered with brownish-yellow scales, three whitish vittæ on upper-surface (one down middle and one on each side); elytra thickly covered with brownish-yellow scales; an obsolete whitish vitta along suture, another very conspicuous whitish vitta on each side between fourth and fifth rows of granules, a broad white stripe along each lateral margin; under-surface shining, a broad patch of very short yellowish scales on middle of each ventral segment; legs (particularly the tibiæ) covered with white scales.

Rostrum very broad, short, not divided from head on upper-surface, almost vertical on sides; anterior lamina triangular, the apex rounded, a deep channel just behind it and following its course; external ridges diverging a little backwards, not elevated along sides of rostrum, continuous with the frontal crests. Head and rostrum flat; front with a long triangular horn or crest on each side projecting outwards obliquely over the eye in line with the external ridges of rostrum, a light sinuosity where the horn and external ridge meet. Prothorax much broader than long (2·75 x 4 mm.), widest about middle, strongly rounded on sides, strongly convex transversely, not convex longitudinally; anterior margin very lightly sinuate, the middle not projecting over the

head ; base truncate ; granules of disc widely separated, round prominent, shining, unisetigerous, those near front small, none along course of the vittæ, those of sides closer and more conical. Elytra short (7·5 x 5·5 mm.), much wider than prothorax, strongly rounded on sides, widest rather behind the middle, transversely convex ;. disc longitudinally convex, not flattened ; posterior declivity round, abrupt ; base broad, much wider than prothorax. roundly emarginate ; the shoulders not projecting forward ; apex rounded, without sinuosity or projection near suture : striæ irregular, subfoveate ; interstices closely and rather evenly granulate, the granules small, round, shining, a little confused on disc, each bearing a long decumbent seta.

Length, 12 ; breadth, 5·5 mm.

Habitat.— Murchison River District, W.A.

I have not ascertained the sex of the specimen described, but I think it is the female. A single specimen of another species is in my collection ; in it the external ridges of the rostrum do not run back into horns on the front, the elytra are foveostriate and without granules ; it seems to be a male ; if so the exual characters are not very different in the sexes in this genus.

ANTHROPOLOGY.

By RICHARD HELMS.

Explanatory Preface.

The accompanying paper on the aborigines has been written by me in response to repeated requests.

It was not my original intention to publish these observations, which were made merely to gratify my own desire of acquiring some information concerning the habits and customs of the Australian aborigines.

As Naturalist of the Elder Scientific Expedition, such a line of enquiry lay altogether outside my duties, which were so multifarious that my ordinary time would not permit of a systematic study of the subject. On this account my observations are often extremely fragmentary.

The "Extracts from my Diary" are the impressions as they were conveyed to my mind at the time, and were jotted down while fresh in my memory. For this reason I have given them in full, even at the risk of occasional repetitions in the course of the paper.

Regarding some ideas advanced by me in the context, and the conclusions drawn from them, although not pretending to pose as an undisputed authority in this matter, I can only court fair criticism, which I cordially invite.

To my friends, Messrs. C. Fuller and D. N. Saunders, of Sydney, I owe my warmest thanks for the various drawings that accompany this paper, the execution of which it is needless to praise, as the plates speak so graphically for themselves.

Plates 30 to 39 are reproductions from negatives taken by the medical officer of the Expedition, Dr. Elliott, during the trip.

The paper was written in July, 1893, with the intention of publishing it before the end of that year. Unforeseen circumstances, however, delayed its publication, and it is only now, after more than two years, that opportunity has been afforded me of revising the MS. for the press. In this my friend, Mr. F. B. Guthrie, Chemist to the Department of Agriculture, Sydney, has rendered me most valuable assistance, for which I take this opportunity of thanking him.

Sydney, August, 1895.

Introduction.

It is an acknowledged fact that the native tribes of Australia, like every other indigenous inferior race under similar conditions, are fast disappearing before an advancing civilization. The encroachments made yearly upon their territories, where for many centuries they lived in unfettered freedom, must soon make their results felt throughout the whole continent, because the law of the survival of the fittest will surely, and at no very remote date, assert itself to the detriment of the aborigines. This has already taken place around almost the whole of the Australian coast, and along the leading rivers. It is, therefore, only in the far arid interior that we can hope to find a primitive people. Here some tribes may be found that have not yet come into contact with whites, particularly in the central western district of South Australia, and in the great eastern deserts of Western Australia.

From the nature of the country, mainly on account of its extreme aridness and the consequent lack of an equable production of vegetation, the aborigines inhabiting these vast tracts are likely to remain in undisputed possession of the land long after their brethren now living nearer the coast have ceased to exist. It is quite possible that tribes may yet survive in these remote wilds when the many cities of this continent will be crowded by millions of Australian-born whites, who may scarcely be aware of the existence of Australian blacks. However undisturbed the life of these blacks may be they are not likely to increase, because the unfavorable conditions of the country forbid a large population. Perhaps a few hundred years hence some enthusiastic anthropologist may still have an opportunity of studying in these remote deserts the scattered remnants of an almost extinct race under their natural and unaltered conditions, which may then be observable nowhere else. It is, however, desirable that the study of the natives should not be neglected till they are thus reduced in numbers.

The aborigines of Australia are a paradox amongst the races into which anthropologists have divided the peoples of the earth. Whilst on the one hand they possess habits and customs as well as traits of character that are indicative of a very high culture, on the other hand their general state of savageism places them without dispute in the lowest grade of barbarity. These contradictory aspects, that must force themselves upon every thinking mind who comes in contact with the natives, make them extremely interesting subjects for psychological study. Although in our present matter-of-fact times I have no doubt the question will be asked, What practical result does such a speculative research promise? I hope that there will always be found a

sufficient number of chosen spirits who appreciate the value of a problem for the difficulty of its solution, and deem nothing mean enough to know, though such knowledge may not always be of a lucrative character.

With these introductory remarks I beg to offer the following short account of the result of a few months' observations to those interested in the subject, with the hope that it will be accepted as a contribution towards completing our knowledge of the aborigines of Australia.

Tribal Characteristics.

Unfortunately, I am only able to generalise upon this interesting subject, because neither cranial nor other anatomical measurements were made by me during the trip, partly owing to the want of time, and partly to being unprovided with the necessary instruments for this purpose.

With the object of distinguishing the various tribes I have divided them according to the geographical names of the districts in which they were encountered. This geographical nomenclature I was obliged to adopt because I could not ascertain the correct tribal names from the natives, through ignorance of their language. Thus, omitting those met at Warrina and Cootinoorinna, I have named the tribes as follows :--

The Everard Range Tribe, S.A. Met near that range, and represented on plates 30 and 31.

The Blyth Range Tribe, S.A. Met first at Camp 12, and later at Camp 15, and past the range they have been named after ; represented on plates 32 and 33.

The Barrow Range Tribe, S.A. Met at Camp 33 and near Mount Squires. See plates 22, 23, and 29.

The Victoria Desert Tribe, W.A. Met near Camp 40 and between Camp 43 and 44. See plates 24 and 25.

The Fraser Range Tribe, W.A. Met at the Fraser Range ; represented on plates 34-37.

The Hampton Plains Tribe, W.A. Met at the Fraser Range and near Hunt's Well ; represented on plates 38 and 39.

The Yunga Tribe, W.A. Met at the Fraser Range.

The Murchison District Tribe, W.A. Met near Annean Station.

Besides these tribes, of which for the most part only small numbers were congregated together, single individuals belonging to different tribes were met with at various times.

Amongst the tribes here enumerated those of the Everard Range and Murchison District were the most robust. Only four adults and one young individual of the first were seen, but from the fact that the country they inhabit is better supplied with the

means of sustenance than that further west, it is reasonable to suppose that they represented their tribe in average physique, particularly as they were in good condition.

The Blyth Range men were decidedly inferior in condition, and considerably smaller in stature, more especially some of those that visited us at Camp 12. Others met with later on were somewhat taller in stature than the average Blyth Range specimens. Those seen, both at Camp 33 and near Mount Squires, were all over five feet six inches; amongst the latter assembly was one about six feet. The improvement seems to be attributable to the better water, and consequent better food-supply of this region. Their condition was, however, very poor, due, no doubt, in some measure to the protracted dry season, that would prevent them hunting over the full extent of their district, and force them to keep close to the waterholes, where, in consequence of the continual drain upon these contracted limits, the food-supply would soon become scanty.

Of the Victoria Desert tribe, only once a party came under my observation, between Camps 43 and 44. This was a very variably-sized lot, including, however, one fine specimen, but all were much emaciated.

The Blyth Range, Barrow Range, and Victoria Desert tribes inhabit "spinifex country," where subsistence is difficult to maintain, and but for the numerously-occurring *Largochestes hirsutus*, commonly called "Spinifex-Wallaby," and some other small marsupials, it would probably be impossible for them to live in such desolate districts. It can scarcely be wondered at that the majority of them appeared lean and starvation-stricken.

Those inhabiting the surroundings of Victoria Spring* I was not fortunate enough to see, though plenty of indications proved that blacks had congregated at times near to where we camped, but not recently. They were evidently not far away, because fires were seen about 12 to 15 miles from the spot. It would have been interesting to have compared them with the other tribes, because the food supply is much scantier in this region. The *Largochestes* is almost, if not totally, absent here; and some 150 to 200 miles to the north, the eagle-nests, which we had previously noticed daily, disappeared, which at once proved the decrease of these small marsupials.

The stunted physique of the Fraser Range natives must, in my

* No doubt exists in my mind that Victoria Spring was never visited by the Expedition. A clay-pan, the surroundings of which do not at all answer to Giles' description of the natural feature, was mistaken by the leader for Victoria Spring. We were, however, in about the same parallel of latitude, and cannot have been very far away from it.

opinion, be attributed mainly to the poorer and insufficient food-supply in that district.

As to the Murchison natives on the other hand, the greater abundance of flesh food has probably had its beneficial influence upon them. Kangaroos must be fairly abundant in ordinary seasons in that district, although at the time of our visit they had suffered a great deal through the drought, as became apparent by the number of dead ones found near every well, where these poor brutes had come to drink, and got drowned.

Summarising the foregoing, it may be said that in general the physique of the males is fairly good, but their stature is, with few exceptions, not above the middle height, but frequently below it, and that their appearance is as a rule emaciated. The walking endurance of these blacks is undoubtedly great, but beyond that I do not think that they are very powerful, because they are scarcely ever well-enough fed to develop much muscle, nor do they exercise any other than those of their legs to any extent. The throwing of the waddy and that of the spear require rather skill than great strength.

Owing to the excessive quantities of food they at times devour most of them have a considerably distended abdomen that becomes more conspicuous when contrasted with their generally thin limbs. The few that are working at the stations and get fed regularly contrast very favorably with the wild blacks, so far as their outward appearance goes. It was quite surprising how rapidly those put on flesh who stayed for some time near our camps.

Many have a broad, and in some instances high, forehead, indicating intellectual faculties, which, however, it seems in the most cases are more difficult to cultivate than the appearance of their head would lead one to expect. As a rule, the forehead is slightly receding, and the brows prominently arched and protruding. Their senses of seeing and hearing are very sharp, and are no doubt much improved by the continuous training they get in the pursuit of game, but the other senses do not appear to share these advantages. The cheek-bones are often very prominent, and the face on the whole rather broad. The nose is short and dilated at the nostrils, which is characteristic of most aborigines; but occasionally quite aberrant types are met with. Among the Blyth Range tribe was one who had almost a European cast of features, with a narrow, well-shaped nose; and among the Fraser Range blacks I found one who had a moderately aquiline nose and a decidedly Jewish appearance. The mouth is large with most individuals, and the lips thick; their jaws are very powerfully developed, and their teeth sharp and strong. I have seen them frequently break sticks thicker than a

man's thumb between their jaws, a method that is preferred by them to breaking it across the knee. Besides the use of their jaws for the purpose of breaking sticks, and that of the teeth for tearing the bark off, the habit of picking up things from the ground with the toes struck me as one of their peculiarities. Almost anything is grasped by them between the big and the other toes, and by bending the leg up at the knee is brought to the hand. Rarely does a blackfellow stoop for anything if he can help it. The hair is dark and somewhat wiry, but mostly wavy, and sometimes curly. When it gets long it becomes occasionally bleached, especially at the tips, and then looks brownish, and often dingy. Its growth is profuse with the males, but less so with the women. The beard is seldom very strong, and often almost absent; and the hairiness of the body only in few individuals strongly developed. As a rule the chest is nearly smooth, but on the arms and legs they are more hirsute. The color of the skin is generally dark-brown, and often dull-looking, but when they are well fed it becomes blacker and shiny. A good deal of the natural color is influenced by the pigments they rub themselves over with, and which to some extent becomes ingrained into the skin.

Prior to reaching the Fraser Range only men and boys were seen by us, with the exception of a small girl at Camp 40. At the Fraser Range, however, there were a number of women. (Pl. 37.) These were nearly all very short, puny, and dreadfully starved-looking specimens, and appeared to be of considerably inferior intellect to the men. Proportionally, their legs and calves are much thinner than those of the other sex, and their walk is shuffling, with the feet invariably turned inward. Although both sexes walk a great deal, their feet are by no means large—in fact, in some instances may be called small; but they are rather dilated across the toes. Their hands are rarely very large; with some of the women I found them really small and well-shaped. The only tall woman seen was a native of Hampton Plains. She was about five feet eight inches. (Pl. 38.) The skin of her abdomen was much crumpled, evidently in consequence of child-bearing. This was the only case in which such an effect was observed; the skin of other women who had borne children was quite smooth.

Amongst all the tribes from the Blyth Range to the Fraser Range inclusive, individuals were met with having pink markings on the abdomen and chest. This was probably owing to some kind of skin disease, although I was told it was the result of some burns received through carrying the firestick too close to the body during windy weather. This is the only indication of a disease I have noticed among them; but I was informed that in

several places nearer the coast, and where the goldfields of late years have been discovered, venereal diseases are becoming quite prevalent, and, in many cases, have assumed a most virulent character.

A considerable number of deformities are found among the Victoria Desert tribe and near the Fraser Range, which, however, are the consequence of accidents, and in most instances, caused during childhood. Only in one instance did it seem likely that the defect was born with the person. Not a single deformed woman was seen, which makes one surmise that if a female child is severely burnt (which must occur proportionately as often as with a male), it is done away with without mercy, but that the male children receive sufficient attention to recover. Why otherwise were female cripples not also met with ?

In disposition and character these blacks are as variable as Europeans. Cheerful or morose, industrious or lazy, willing and disobliging characters may be discovered among them, and even selfishness I have observed, although this perhaps less than any other fault. Most of them are easy-going, and perhaps lazy, according to a white's idea, but on the other hand I have seen them work very hard without being much urged. Patience they possess to such a degree that it may almost be called callousness, but their improvidence characterises them perhaps more than any other peculiarity. They are also given to sulk if offended, and will not be driven to do a thing they object to, as far as my experience goes, but may be coaxed to do many things In this respect they resemble stubborn and spoiled children very much, which to some extent they are from their infancy. As a rule, the children get things pretty well their own way, and are left to look after themselves a good deal, or to follow the mothers when these go out for food. It is not that the children get their way by crying, for that they seemingly rarely do, because I never heard a single sound of the kind, not even from babies. When food is prepared, they either help themselves or get served first, which naturally satisfies them. I never even heard them spoken to in a scolding way. When I had occasion to speak to them sharply—as was the case several times when they became too meddlesome—they sneaked off with a demure face, and generally met me with sulky looks for some time after. When once they are able to run about, the boys are at times much petted by the men, who cheerfully try to amuse them, and caress them.

It speaks, no doubt, greatly in their favor, that during the whole of our trip not a single thing was stolen from the camps ; only on one occasion, near the Blyth Range, when I was skinning a small animal, one of the blacks who was watching me,

secreted my knife under his foot. In the occupied country they often get accused, and probably justly so, of stealing sheep, but if hunger pinches, and temptation is afforded, they can hardly be severely blamed for such thefts, because, after all, through the introduction of sheep, their supply of natural food gets considerably reduced.

A remarkable *lusus naturæ* was observed amongst the women of the Frazer Range, one of whom had six perfect fingers on each hand and the same number of toes on each foot. Not only were these limbs perfectly formed, but the corresponding metacarpal and metatarsal bones were also perfect. (See pl. 36.) Two of her brothers and a sister had, I was told, exactly the same deformity.

Habits and Customs.

The tribes of the interior are probably more nomadic than those inhabiting the coast districts or the river borders, which is, no doubt, entirely due to the more scanty food-supply in this locality. Their vast territories have almost constantly to be roamed over by them for the purpose of securing a living; and it is only near the larger rock-holes that they are sometimes able to make a prolonged stay. This is probably also the reason why, as a rule, only small assemblages are met with, because large numbers would find it difficult to get sufficient food in the same place.

Their sleeping-place is the bare ground, on which they lie without the least covering, and only warmed by a couple of small fires, one on each side, that require frequent remaking during the night. When a number are together, they make a row of fires, and lie between them alternately, and in this way make one fire serve two of them. The custom of lying quite naked they are so used to that the native who accompanied us for some time would divest himself of all the clothes we had given him before he laid himself to sleep, although the nights were very frosty. The habit of going almost instantly to sleep at will is an enviable advantage of their constitution, because without it their night's rest would not refresh them much, on account of the frequent necessity for replenishing the fires. As soon as they begin to feel cold, and wake up in consequence, they rake the embers together, and having put a few fresh sticks upon them, they lay their heads down again, and are off to sleep in a few moments.

During wet weather they build brush huts, or rather shelters, which are easily erected when required. Two forked saplings are placed together, forming a triangle with the ground, and leaning a little away from the weather side, are supported by a third sapling. The apex of this triangle is about five feet from the

ground, and on it rest one or two somewhat longer saplings slanting against the wind. Over these are placed bushes in such a fashion as to form a semi-circular, roof-like shelter, which at times is covered with grass or tussocks of spinifex to keep out still better the wind and weather. (See pl. 30.) Abandoned shelter-places of this kind are frequently met with throughout the country—single ones, or in groups of two or three. Owing to the ease and rapidity with which they are constructed it is less troublesome to build a new one than to travel any distance in search of an old one. This accounts for their being met with so often in a country where rain may sometimes not fall for years, for it is only when cold beating rain occurs and the natives cannot keep a fire going that these shelters are used by them.

To use water for the purpose of washing the body seems to be, in their opinion, a gross waste of this valuable element—at least, I have never seen them use it for any other purpose but to drink. They certainly rub themselves at times with grease, but more frequently with ochre all over the front. The ochre is ground on a flat piece of rock with a convenient handstone, and with this the adhering coloring-substance is rubbed on to the body. The greasing no doubt makes the skin supple and comfortable, but the application of ochre and similar substances cannot possibly do so. However, this and other pigments such as pipeclay and roasted gypsum are in frequent use; the last-mentioned, as a rule, only for particular markings and designs, the symmetrical curves and lines of which give them at times quite a picturesque appearance. (See pl. 20, 22-27.) Charcoal is also sometimes smeared over the face, and one individual I met had rubbed himself all over with a greyish clay that gave him quite a light appearance. The hair of the men generally receives a considerable amount of attention. After a good meal I have seen them loosen it out and work the fingers through it like a comb for some time, and then with care and deliberation fasten it up again. Nearly all tie the hair back from the forehead at times by winding a twisted string made of either human or opossum hair several times very tightly round the head. Some also bend the hair under at the back and form it into a chignon-like knob (pl. 21) by winding the string crossways back and forward. This gives them a strikingly peculiar appearance, and as the hair is very tightly pulled back, so that the string almost cuts into the skin at the forehead, this head-dress must be rather uncomfortable; but it seems the blacks have got used to it, or probably endure it to show their fortitude. During the day's march this chignon serves as the receptacle for small things that may be found on the road. Often a handful of scented grass is turned in with the hair, and some I have observed to put an ornamented stick crossways through it. At

times the knob is formed on top of the head instead of at the back of it. A plan also very frequently adopted is to fix up the hair by the application of grease and ochre, forming it afterwards into strands the thickness of a finger. When this is dry and the head violently shaken, or sometimes during running, a clattering sound is produced. Some had very short hair from the front to the crown of the head, as if it had been cut; but it must either have been pulled out or singed off. Others I have seen to ornament their heads by twisting the fur from the tips of animals' tails into the ends of it, and letting them dangle down the back of their necks. Similar pieces of fur are also sometimes twisted into the beard or moustache. Tails either of the dingo or of the domesticated cat *(Felis domestica)*, which has become feral in certain districts, had been utilised for this purpose. Probably on account of the rarity of these animals, and because of the difficulty in catching them, their fur is more prized than that of others. I only saw the tip of a cat's tail used once, namely, near the Blyth Range, where the animal must still be very rare. (*Vide* remarks about this in "Notes from my Diary" as well as pl. 26.)

The women pay little attention to their outward appearance; only in some instances have I seen them with their hair tied back, but never made into a chignon.

None of the tribes we encountered were covered with any kind of garment; both sexes go about in a perfectly nude state. The men as a rule have a twisted hair-cord wound a few times round their body that serves to hold some of their implements, and which they tighten to assist them in bearing the cravings of hunger. In one instance only did I notice an attempt to cover the person, where a man had attached some light-colored twists made of opossum (?) hair to the pubes, just about long enough to cover the penis. (Pl. 25.) It looked almost as if it were meant for a special ornament rather than a covering, and may possibly have had something to do with one of their secret rites.

They are, without doubt, frugal-minded and happy in their way, for as long as they have enough to appease the cravings of hunger they appear merry. Towards evening they often start games amongst themselves and with the boys, such as throwing waddies at each other, which they skilfully parry, or evade by jumping aside; or they trundle a hoop swiftly along the ground and throw at it. This is done as much for the purpose of giving the boys some practice in throwing the waddy as to afford them amusement. A frequent pastime during the evening round the fire is the making of bird and other tracks on the flat surface of a padded plot of sand. Considerable arguments arise at times as to who produced the best representations, which are generally

impressed with the fingers, and sometimes finished off with a little piece of stick. It will be seen that these amusements are always more or less instructive.

When congregated together from various districts, as was the case at the Fraser Range, corroborries are frequently held at night for the entertainment of both men and women. Only the men took part in the one I saw, which was not of special interest, but the night previous elaborate head-ornaments had been used in some special dance. As I did not see this dance I cannot describe it, but from what I heard some allegorical significance must have been attached to it, the meaning of which, however, I could not ascertain.

The very timid lot that was surprised by us at the rock-hole between Camps 43 and 44 were anxious to pat us on the chest, when they allowed us to approach, which we returned, taking it to be a sign of friendship. On a previous occasion a black attached a piece of fur from his beard into that of Mr. Streich's, which was evidently intended as a pledge of friendship.

Near Mount Squires the blacks, after receiving a gift of meat, returned thanks in their fashion, which has been more particularly described in "Extracts from my Diary," and is illustrated on pl. 29.

Approaching a camp at night the natives always shout from a distance, and only enter when they have been recognised.

They are always careful to carry a piece of burning bark with them on their day's march, or whenever they go any distance away from camp; this is partly for the purpose of setting the spinifex-grass on fire, but principally to have fire ready when about to settle down again. The dry bark of the dead "Mulga" furnishes convenient strips for this purpose, which are, as a rule, readily obtainable, because this tree is the most common in the interior, and frequently forms dense thickets in the level parts of the country. The universally-prevailing habit of carrying fire with them is, no doubt, necessary to some extent, on account of the difficulty of making fire by friction from hard wood, soft and pithy kinds being unobtainable. One of the best substances for this purpose is a dry seed-stalk of the grass-tree, which, however is very rare, in fact, the tree was only met with in a few places towards the southern part of the Victoria Desert.

From this continual habit of carrying fire about with them, one is almost inclined to believe that they have lost the art of producing fire by friction. At any rate, they cannot be very expert at it, and although I tried several times to induce different individuals to make it for me in that way, I never succeeded.

As far as the Hampton Plains, from the first time a black was

met with at the Everard Range, I noticed a piece of lighted bark was their constant companion.

To find that the natives of the Everard Range and Blyth Range tribes use tobacco was a surprise to me. It struck me as peculiar when I noticed their lips and the corners of their mouth being colored with a yellowish-green rim, and attributed it at once to some peculiar food they might have been eating, but later on I discovered that its true cause was the sucking of a roll of native tobacco. The crude method of the preparation of this tobacco has been described in "Extracts from my Diary," and the way it is used is depicted on plate 29, where it will be noticed two aborigines have a roll of the narcotic lying on their lips.

Whilst these tribes have discovered the stimulating properties of *Nicotiana suaveolens*, they do not seem to know the more powerful narcotic of "pituri," *Duboisia Hopwoodii*, which also occurs in many places throughout the same regions.

Both plants were found from the Everard Range to the Barrow Range and throughout the Victoria Desert along our route, although in varying abundance and under different conditions of growth.

The *Nicotiana suaveolens* grew most luxuriantly about the soakages near the Everard and the Blyth Ranges, where some of its oval and glabrous leaves reached a length of over ten inches by a width of nearly four inches, and the plants stood over four feet high; but at the Cavenagh and the Barrow Ranges and among the sand-dunes of the Victoria Desert the plant becomes diminutive and dwindles down to a height of ten inches, with leaves of from a-half to one inch in length, which are here also more rounded and pubescent.

With the Barrow Range and Victoria Desert tribes I did not notice the use of this tobacco, and am certain that it is unknown to the tribes of the Fraser Range and of the Hampton Plains. The plant was not noticed by me much further than the Fraser Range, and in my opinion is likely to occur only sparingly in the country between Yilgarn and the Murchison. I did not find it at all along this route, but as nearly all the herbaceous plant-life was extinct at the time of our journey through that district my not finding it cannot be taken as a proof of its non-occurrence. As far as I could ascertain the Murchison blacks are not acquainted with the plant.

The use of the native tobacco as a stimulant is, as far as I know, only habitual with the Everard and Blyth Range tribes. In their districts the plant certainly grows to perfection in the humid soil near the soakages of the ranges, which conditions, however, may be found equally favorable at some of the ranges

situated further north. Its use may, therefore, be more widely distributed, but not in a westerly direction.

Duboisia Hopwoodii, which is much prized by some of the West Queensland tribes, occurs throughout the central region of Australia. I collected it first at Camp 9, and found it in places all through the Victoria Desert, and have no doubt that it extends to the verge of its western limits. I have, however, never seen this plant used by any of the natives, and, therefore, think that its properties are unknown to them. It seems to me that only the prepared leaves and stalks are known outside of the district where "pituri" is gathered at present, and those natives who acquire it by barter are entirely unacquainted with it in its natural state, or else its use would have spread certainly much further than it has done, considering that generally most natives who once have tasted this intoxicating drug get a craving for it, and are always desirous of obtaining it again.

All aborigines of the interior circumcise, and also slit the urethra ;* but at what age the one or the other rite is performed I am unable to state from my own observations. That circumcision precedes the other seems to be sufficiently well confirmed by the fact that some young men where met with who had had the first-mentioned rite performed upon them, but not the latter. Most of those we encountered had one or the other central incisor knocked out, and all were more or less tattooed by scars on the chest, arms, or back. Every one had besides the mutilations and embellishments mentioned, the septum of the nose pierced, to hold the "kondell," or nose-stick, which is, no doubt, also considered an ornament, from their point of view.

From the fact that some of the young men, and all the boys, had a full set of teeth, it is fair to conclude that the removal of one tooth is to some extent connected with the ceremonies that declare the youth to have arrived at the state of manhood. There can hardly be any doubt about it that these painful operations are mainly performed for the purpose of trying the courage and stoicism of the youths, and to make them accustomed to the endurance of pain. The tattooing may besides have something to do with the distinguishing of the pedigree of the individual, but the marks are intended principally as adornment.

Regarding the mutilation of the sexual organ, it becomes rather difficult to determine the purpose which it is intended to serve. The incision of the urethra is supposed to be done in order to prevent over-population, and as this rite is principally practised where food, as a rule, is scarce, or may become so at

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* This mutilation is by different writers variously alluded to as the terrible rite," the "mika operation," or "Sturt's rite."

any time through continuous adverse seasons, this supposition appears to be the most probable one; and the adoption of this plan appears to furnish the most practical solution of this important problem, which has engaged some of the foremost thinkers of the civilised world during many decades. If, however, the very retarded mental development of the Australian race is taken into consideration; if it is further borne in mind that most of them cannot conceive a number beyond three; that they are the most improvident beings on the face of the earth; that cannibalism is practised by nearly all the tribes; that children are destroyed immediately after birth or later, and are often allowed to succumb through neglect; that throughout the whole continent the superstition prevails of killing by the "pointing of the bone," it must be admitted that their ideas are far too distorted for them to have invented a system for the prevention of over-population, which involves an enormous amount of forethought, and would, moreover, require a clear conception of the multiplication table. When it is further considered that the distinguishing characteristic of the Australian race is their improvidence, and that the lives of their enemies are readily sacrificed and their flesh eaten, the natural result of over-population would most likely be a more extended cannibalism, as has been the case in nearly all the South Sea Islands from the same cause. It is highly improbable that this race in its present state of mental development could possibly have conceived a system with a high ethical tendency, whilst their actions contradict a sentiment of such deep philosophy. And, furthermore, although they have stringent matrimonial laws in one respect, their sexual desires are so strongly developed that even licentiousness is at times freely indulged in, in the face of which fact alone it seems improbable that they are likely to deprive themselves of the least portion of the pleasure of coition. This must, however, to some extent follow the slitting of the urethra. In consequence of the mutilation of the male organ, the female has to submit to an incision by which the vagina is enlarged towards the lower side. This must also tend to reduce the excitement to be derived from sexual connection, and seems, therefore, completely against the natural propensity of these beings.

The fact remains undisputed, nevertheless, that the rite is performed, and that it acts with great effect in retarding population cannot be doubted; but whatever its origin may be and whence it has been communicated to the blackfellow is a mystery.

Considering this extraordinary rite, together with their complicated marriage laws, the existence of which have been authenticated by almost everyone who has become acquainted with the customs of the blacks, besides other remarkable features of intel-

lectual culture—of which I shall make mention further on—it comes almost naturally to one's mind that they must be either the remnants of a highly advanced culture once possessed by this people, or that a race preceded them in this land, who, being highly cultured, were gradually suppressed, but not before implanting some important characteristic practices upon them; or, thirdly, that a shipwrecked crew of an advanced nation spread these customs amongst them.

The last supposition might have been possible, because traces of the occurrences of wrecks during remote historic times exist; but it is scarcely very probable, because in such a case these customs would have spread from a common centre, and in this case would most likely be found somewhere near the coast. However, nearly all around the coast of Australia this most important and interesting rite is not practised now, but almost universally throughout the interior.

For the second suggestion, that a cultured race preceded the present inhabitants, no traces of any kind exist. Although it is not impossible that men were contemporaneous with the now extinct gigantic marsupials that inhabited this continent, it is almost too venturesome to state such a supposition. At the same time, it is quite imaginable that immigrants settled in Australia long before the remotest time of known historic events. These early dwellers, however, belonged, probably, to a rather lower type than the present natives, and may have been identical with the now extinct race of Tasmania.

The first conjecture, therefore, seems to me the most feasible: that it may fairly be concluded that the aborigines of Australia have become a retrogressive race.

Besides the rite dilated upon above, it is strange to find the intricate marriage laws amongst them, that forbid near blood-relations from cohabiting, which shows a deep grasp of the detrimental consequences of such marriages, and involves besides a moral standard far beyond their present general conception of the ethics of life. There are, moreover, several other indications that favor the idea that the race has become retrogressive. How, for instance, can it be conceived that the present race invented the boomerang? It has been asserted that a falling gum-leaf gave the intimation for the first production of this implement. If this were true, one must attribute to the native a higher deductive talent than is at present perceptible. And, further, how can it be imagined that a black in the present state of development could have invented the wommera, this marvellous and unique lever. Admitting that the application of a simple lever comes almost naturally to anyone who has but the least experience in the practice of hand-work, the application of the prin-

ciple to the method of throwing the spear becomes far too complicated for the intellect of a blackfellow. To this I must yet add the rite of circumcision, and the belief in the transmigration of the soul. This useless rite, that is practised by many nations, and is spread over a vast extent of the globe, elevated by many to an important religious ceremony, and retained by highly cultured peoples, although it lacks all ethical and æsthetic value, could hardly have been devised independently by the secluded Australian race. Nor could the belief in the transmigration of the soul have come to them by intuition, and consequently it is more probably the result of the imprints left behind by some highly cultured minds that influenced their ancestors.

It is almost certain that at present the origin of the rites, as well as the reason for their practise, is completely lost by the Australian natives, and that they have now become reduced by them to habitual customs, practised mainly for the purpose of retaining authority over the young men and the women.

The conclusion I have arrived at is that prior to the commencement of migration into Australia, the ancestors of the present race must have been imbued with a much higher culture than now exists, and that through stress of circumstances, and diversified conditions, their mental, and also in some instances their physical, calibre has become reduced, and the import of many of their customs has been completely lost in consequence, whilst the practice thereof is retained. If a people inferior to themselves preceded them on this continent, which is by no means improbable, these may have influenced their present condition inasmuch that they have absorbed them to some extent; for example, where small numbers of either race were brought into contact with each other in remote parts, where neither were numerically strong enough to suppress the other, or where the males only were killed and the women allowed to live. Such admixture may to some extent have influenced the mental and physical condition of some of the tribes, and consequently the diversity now noticed between many of them may not be due solely to the difference in the abundance or otherwise of the food supply.

These conclusions are borne out by the facts that the rites of circumcision and mutilation are conjointly practised nearly throughout the interior of the continent; that the one or the other is practised in the intermediate tracts, and that neither is practised by most of the coastal tribes—in fact, as far as I can ascertain the Kimberley coastal tribes are the only ones of this class who practice these rites. To explain this peculiar phenomenon it must be supposed that the conservative dispositions were more tenaciously retained by the natives of the interior than with

those living near the coast, which is not difficult to understand when their secluded manner of life is considered. An analogy may be found in the South Sea Islands, where the language and customs on some of the isolated and remote islands are often identical, whilst intermediate places inhabited by the same race have altered considerably.

It can, therefore, scarcely be credited that these rites should have had their origin in the arid interior, and it is justly presumable that at one time all tribes practised these rites alike, but that they fell into disuse along the coast, where life is more variable, when the tribes increased in numbers; but were scrupulously retained amongst the less expanding tribes of the interior.

Whence and how the aborigines came to Australia is as yet a problem veiled in obscurity, and, therefore, for me to speculate upon it at present would be too venturesome; it is to be hoped, however, that the steadily-advancing progress of ethnological and anthropological knowledge will find the proper clue to it, and bring its solution before the natural conditions of the aborigines are entirely disturbed or the race has vanished.

Water and Food Supply.

The western interior of Australia being entirely devoid of rivers and permanent creeks and almost of any other permanent water, the tribes inhabiting this region have to depend upon the occasional rainfalls and thunderstorms for their water supply.

In favorable seasons, no doubt, many large claypans and temporary running streams afford ample opportunities of securing this necessity; but during continued dry seasons they have to depend solely upon "rock-holes" and "native wells." The rock-holes seem to be almost a special characteristic of this portion of Australia, and without them it would be impossible for the natives to exist. They are mostly found in granite, a softer mass or nodule having been weathered away, thus forming natural cisterns of various shapes and dimensions. Some of them will hold many thousand gallons when filled, and as the water cannot escape by percolation the supply will last for a long time. To prevent animals getting at the water, most of the rock-holes are partly or entirely filled with loose-lying sticks, which practice, necessary as it may be to save the water, deteriorates its quality considerably by making it often look quite black and giving it a fetid smell and taste. Coming to a rock-hole once some of the camels drank, and one of them micturated on the rock; the flow was prevented from getting into the water by some of the blacks placing handfuls of earth quickly in front of it. They behaved in a very excited way at the prospect of having their water polluted, which contrasts rather favorably

with many of their careless and dirty habits. In sandstone formation these rockholes are never of great extent, and from the nature of the rock the water as a rule will not remain so long in them.

The native wells are irregularly dug holes, rarely very deep, and mostly found near the base of some range or hill where a concentrating catchment-area promises a good soakage. These holes are also often filled with sticks and debris, and frequently even with sand, to prevent evaporation and hinder animals from getting at the water. Certain small soakages under rocks near the base of some hills, known to the natives, and yielding only small supplies, are always completely covered up again when leaving. The supply from such sources is scarcely better than that obtained from the roots of the mallee. This last-mentioned supply is no doubt in many places often resorted to, and when the proper kind of root is found yields a splendid, clear, and cool water, that at times drips rapidly from the broken roots when they are held vertically. It requires, however, the knowledge of an aborginal to hit upon the proper tree, for which there are probably some outward signs only known to them, because my own efforts led me only accidentally to a root holding water, after trying a good many before without obtaining a drop.

Sometimes hollow trees harbor water, and preserve it for a long time from evaporation. The keen eye of a black will easily detect such a reservoir by one or the other indication. I remember on one occasion that a native noticed a string of ants going up and down a tree, entering and emerging from a small knothole about his shoulder-height from the ground. This was quite sufficient indication for him, and making himself a tube from a straight twig, by loosening the bark between his strong jaws, and then stripping it, he obtained a drink by sucking the water up through this impromptu syphon.

The "wanna" and the "wera" are the constantly accompanying implements of the blacks of the interior, and are frequently used during the whole day for the purpose of digging, either for water or food. The wanna is used for loosening the soil, or as a lever when roots or stones require lifting, and with the wera the loosened stuff is scooped up. It does not take long to go down a couple of feet with the help of these two implements, and the presence of either water or food, whatever the object of the search may be, is soon proved.

Various are the objects looked for underneath the soil, and as the occupation of the native consists mainly in procuring food, he tries to secure it at every opportunity, and with this motive his eyes are constantly sweeping the ground for tracks and other indications of game. Spying the track of a large lizard, he fol-

lows it to the hole, and with the wanna soon removes the sand for several yards along the burrow to the lizard's tail, by which it is caught, and soon despatched by swinging it in the air and knocking its head upon the ground or against the slantingly-held wanna. At times when these lizards have long and divergent galleries excavated only a little below the surface, the blacks break down these burrows with their heel until they feel the lizard move underneath. A more exciting piece of work than digging for lizards is the excavating for the quick, little, banded anteater, *Myrmecobius fasciatus*, which animal often makes its lair over three feet below the surface, and perhaps a longer distance away from the entrance of the burrow. Here the wera comes greatly into requisition for the removal of the soil when it requires lifting as the hole is going down, because the wanna is only useful for loosening or throwing the earth backward when working near the surface. To secure a single pregnant female ant of a wood-boring species, the ground may often have to be dug several feet deep along the side of a decayed mulga-tree, because these insects harbor, as a rule, near the bottom of the tap-roots of the attacked trees. The much inflated abdomen of these little insects is sometimes distended to the size of a small marble, and contains a bright, light-yellow-colored fluid of a honey-like sweetness, which is much relished by the natives, and generally at once eaten when secured. Other articles of food, which are almost invariably eaten as soon as they are found, are the "munbau" and the "marditti," the white larvæ of wood-boring insects. The first mentioned of these is the largest; it is the larva of a cossus-moth, and grows to the size of a man's finger. The marditti is much smaller, and most likely under this name several kinds of wood-boring larvæ are included. Small birds' eggs are also generally devoured at once, and so are fruits, berries, and other small objects, such as the exudations of edible gum for instance.

Nothing comes amiss to the blacks that can possibly be called into requisition as nourishment, but throughout the greater part of the interior, as far as the Expedition went, their principal flesh-food is provided by the small marsupials that harbor under the *triodia*-tussocks, and are commonly called "spinifex wallabies" *(Largochestes hirsutus)*, occurring abundantly in many places in the *triodia*-region. This pungent grass affords a good shelter as well as food for this animal, which lives to a great extent upon its stems. The blacks are very expert at killing the animals with the "turtimbo," or short throwing-stick, which they handle dexterously, rarely missing their aim when they throw it. However, the many large porcupine-shaped tussocks of *triodia* that cover the ground shelter the little animals well in their quick

and erratic course. If, therefore, the natives cannot get a clear shot at them within 30 yards they rarely throw the weapon. To enable them better to get at this game they constantly burn large patches of the "spinifex" grass, which is one of the most easily ignited substances, green or dry. It is only necessary to drop a few sparks into a tussock, and the sturdy plants will soon flare up with a crackling noise, the flames rapidly spreading before the breeze.

About the ranges and granite-hills on the northern margin of the Victoria Desert great numbers of rock wallabies (*Petrogale lateralis*) are found that are well protected by the many shelters in the fissures of the rocks and the cavities underneath them. These animals are very shy during daytime, and run quickly along the ledges and crags when they are disturbed, disappearing from sight with astonishing rapidity. Towards night, however, they leave their shelters more leisurely to feed on the surrounding ground, their favorite feeding-places being often indicated by well-beaten paths leading towards them. Soon after sunset and during the short twilight they hover about the rocks, sitting upright and brushing themselves in the warm air, which is at this time radiating from the rocks that have been heated by the sun during the day. During this time they may be more easily approached, and without much difficulty stalked to within spear's throw. In many places throughout the country and particularly near some of the rocks, brushwood fences are found that serve, or have served, the purpose of trapping game. These fences are about two feet high, and simply made of broken-down shrubs and branches of trees, mainly mulga, and converge to an angle after extending for a long distance over the ground. Sometimes they are over half a mile long and no doubt have been erected for the purpose of having the animals driven into for a final battue at the angular portion. Near the rocks I have seen them constructed in a zigzag shape, with a self-acting trap at the apex of the angles furthest away from the rocks. This trap is simply a squarely dug hole just outside of the brush-fence about 18 inches wide and four feet deep, with almost vertical sides, which is sometimes lightly covered with a few thin branches. At the inner side of the fence a piece of rock about six inches high is placed a few inches from the hole, and a bar consisting of a stout sapling is laid across the corner on top of the fence above the stone. The latter contrivance seems to be intended partly to hide the hole and partly to make the game jump the stone and tumble into the hole, from which it cannot escape. The nocturnal habit of the rock-wallabies is here taken advantage of, but probably at times the game is also driven into the traps. (See pl. 19.)

About the Everard Range some opossums are found, which are easily caught in the stunted mallee-trees. Whether this animal occurs in the Victoria Desert I am unable to state, not having had an opportunity of securing one during the march across that district, but it is very possible that it does, because it is known about the Fraser Range, where I did not see it either, but obtained the name for it from the blacks by means of a prepared skin. At the same time they could not give me the name of the rock-wallaby and of other animals I showed them the skins of.

Kangaroos and emus occur throughout the interior, for tracks of these were occasionally seen by me during the journey, and the animals came several times under my observation near the various ranges, where no doubt they occur more frequently than in the waterless districts. This large game is stalked and speared, and may be at times it is also driven into the brushwood enclosures mentioned above.

The eggs of the emu yield a good food supply in early spring, and mallee hens' *(Leipoa ocellata)* eggs must also be plentiful at certain times, as the nests of these birds were frequently seen.

A considerable number of eagles inhabit the "spinifex" country, where this bird preys mainly upon the *Largochestes*. As none of the trees grow to a great height, the nests are easily robbed. That some of them had been searched for eggs or fledglings was proved by the presence of saplings placed against several trees to assist the natives in climbing. Eagle eggs I had once an opportunity of eating, and found them very palatable, and in no way rank, as one might reasonably have expected, considering that the bird lives entirely upon flesh-food, and that its own flesh smells very offensively. In fact, it is so offensive that our dog would not eat it after it had been roasted, although he was eager for a little fresh meat. The blacks, however, seem to eat the eagle, because they always regretted when the rifle bullet missed them—as was frequently the case during the early part of the journey whilst we had aboriginal visitors.

All the other flesh-food the blacks secure is very tasty, if prepared in their own fashion, namely, cooked in the hot sand under the embers of the fire, whether it is opossum, lizard, or egg, because it retains its flavor to perfection by broiling in its own juice. I have tasted all these things, and found them delicious, particularly the iguanas. The fur of the animals is removed by plucking it out, and the entrails are abstracted through a small incision, that is stopped up with a little grass; when cooked, and the skin peeled off, the flesh looks as inviting as any dish can. The lizards are cooked as they are caught; the skin peels easily off when they are done, and the entrails are conglobated. When

in a hurry, I have also seen the blacks put the game, whatever it may be, on top of the fire, which is a quicker process of cooking it, but does not make it so palatable, as in that way it often gets scorched on the outside before it is scarcely heated through.

The vegetable food is far less tasty, and also less nutritious. Principally the seeds of the various acacias and some grass seeds are looked for, and, when pounded, are mixed with water and formed into cakes, which are baked in the primitive fashion on hot ashes. Near some of the larger rock-holes the flat surfaces of the surrounding rocks bear traces of the grinding operations, that most likely have been carried on in the same locality for generations. Many of these spots are not only worn quite smooth, but are also ground away to some depth into the rock, forming concave indentations through repeated working in one place. Small oval-shaped boulders that have been used for grinding, and are worn smooth in consequence on the one side, can be found lying about in many directions; they are of different sizes, and have evidently been used either with one or both hands.

The seeds of the Kurrajong *(Brachychiton Gregorii)* are eaten when roasted, and are then a very agreeable tasting food, much resembling pea-nuts. Very frequently when this tree was met with in the Victoria Desert some bruised roots of it were found lying about, indicating that they had been chewed for their sap and the nutriment they contained. The taste of the young roots somewhat resembles that of nuts, and on the bark of these trees nearest the wood a thin layer of a glutinous substance is found, which is of a similar flavor, though rather sweeter, but certainly of a very pleasant taste. However, this seems to be only a kind of make-shift food and is probably only resorted to when hunger is pinching very hard. The same may be said of the food prepared from the bark of the mallee roots, although these trees occur more abnndantly and are oftener called into requisition as food suppliers. Only the bark of the younger roots is used—that is to say, those measuring from half an inch to nearly an inch and a half in diameter; the bark of the larger roots being too woody. After the bark is stripped it is placed on a slow fire, and in a little while the outer black skin becomes blistered and loosened by the development of vapor, and is then easily removed. When this is done the bark is dried on the embers till it gets perfectly crisp, and then it is broken into small fragments. Of these a handful is taken and firmly held down by the left hand on a thick piece of bark, and with the wanna firmly held in the right hand it is pounded into a kind of dust that closely resembles the broken awns of barley. The skill displayed by the women during this manipulation is to be admired. An opening of only about an inch in diameter is left between the thumb and index finger of the left hand just

about wide enough to admit the end of the wanna. This being a heavy cudgel of about four feet in length and an inch thick, with the one end rounded and sharpened and well hardened in the fire, is held a few inches above the sharpened end and brought down with some force upon the firmly pressed bark. An unsteady hand would never hit the small surface with the accuracy necessary to avoid inflicting very nasty wounds upon the other hand. However, the strokes hit the right place unerringly in moderately rapid succession, which excited my astonishment the more because the wanna has to be held somewhat slantingly.

Several herbaceous plants yield them food also, but I will only mention the Nurgu-nurgu *(Thysanotus Patersoni)*, the tuberous roots of which are frequently eaten and generally consumed raw, but sometimes they are roasted. The taste of these tubers is rather insipid and watery (ate them only raw), but I have no doubt that it makes a wholesome diet, and to some extent quenches thirst; the plant occurs plentifully in places.

According to information received from some coastal blacks, those of the interior are cannibals, and rather despised by them for this reason. Some of the white settlers corroborate this statement, and considering the terrible hardships and frequent times of starvation they must have to endure during prolonged droughts it can hardly be a matter of surprise if flesh-hunger leads them to resort to such a practice. Whilst they domesticate the dingo and make a pet of it, they also eat it, about which there can be no doubt, because I found the bones and skulls of this animal near some old camps at Skirmish Hill. An introduced animal, the domesticated cat, has become feral far into the interior, most likely from West Australia, migrating gradually eastward, and is found now occasionally more than a hundred miles to the east of the Barrow Range. Here the tip of the tail of one was presented to Mr. Streich by a native. This animal contributes considerably towards the larder of the aborigines, particularly in the neighborhood of the Fraser Range, where, as I am informed, they occur frequently.

The blacks will eat as long as there is food, and only when it is impossible for them to demolish all they have in one sitting will they reserve some for the morrow.

It may surprise many, but it is nevertheless perfectly true, that I have seen a black eat a large emu egg, two iguanas of about eighteen inches in length, and two opossums at one meal.

Native Art.

PERSONAL DECORATION.

It must be admitted that the blacks of Australia possess a certain artistic taste, and however crude their attempts at the

reproduction of objects may be, it is apparent that the intention is to please the eye, which is undoubtedly the first stimulant for such attempts. This comes perhaps more particularly into play in the ornamenting of their bodies, in the application of colors, as well as in the decoration of their heads with feathers and other embellishments. The lines on their bodies are often very gracefully put on, and considering that every one is his own decorator, the elegant and symmetrical curves one may sometimes see upon them are not only pleasing to the eye, but on account of their accuracy almost surprising. Some of the more striking designs are depicted upon the figures represented on plates 12 to 21.

Although no doubt the tattoo-scars are considered by them to be ornamental, the want of symmetry forbids their being classed as artistic from our standpoint, but as long as it is acknowledged that they are intended to be decorative, art is implied from a blackfellow's point of view.

ROCK-PAINTINGS.

The rock-paintings are mostly imitations of objects coming frequently under their observations, and considering the very scanty choice of material at their disposal, as well as the primitive appliances for executing them with, they are in many instances very creditably reproduced. Some no doubt are meaningless, and are probably only intended for pleasing lines, or the attempt to produce such. Others probably may convey a distinct meaning, somewhat in the sense of those conveyed by the message sticks, and consequently deserve to be considered as true symbolic hieroglyphics. The consideration of these, however, is difficult, principally on account of the insufficient knowledge of the language of the blacks possessed by us, and the consequent difficulty of grasping the idealization of their thoughts.

According to their execution, which differed considerably and proved the greater or lesser skill and patience of the painters, the impression made by these paintings were very variable. This will be more particularly touched upon when the different paintings are separately described.

It is well worth noting that those observed were found within the South Australian boundary, and none at all were met with in Western Australia. This may to some extent be due to the absence of sandstone, because in the granite formation and sand-drifts, rock-shelters and flat escarpments rarely occur. Only the paintings from Mount Illbillie soakage, at the Everard Range, and one other group were found on granite; all others were on sandstone.

The first group of rock-paintings met with were those at the Arcoeillinna Wells, which were known to previous visitors. Be-

fore describing them, however, in detail, I reproduce the notes made on the spot at the time of our visit.

"Near these wells, which were sunk by the Water Conservation Department of South Australia a few years back, are two rock shelters, known to contain paintings by aboriginals. Coming from the east, the low sandstone range near the wells runs almost north and south, and is broken by a narrow gap scarcely more than a chain wide. On the left side of this gap, facing towards the north-east, these two rock shelters are situated; the one is five paces deep, and double that in length, and the other only about one-third of these dimensions. The larger has two openings, having a natural pillar nearly in the centre of its face. It is well arched, and high enough to enable a man to stand upright in the greater part of it. In this cave most of the paintings are found, in fact the roof, as well as the sides, are more or less covered with them, and in many cases they overlap one another. Several broken native grinding stones indicate that this place has been a favorite spot to grind up the various pigments, and the many daubs upon the walls leave the impression that the effect of the colors has been tried upon them after their preparation. One is vividly reminded of the rear parts of a painter's workshop, where all the paints are tried on the back of the doors and the walls, and the brushes are cleaned of the paint after work.

"The designs are undoubtedly of different age, and in many instances, particularly on the roof, which is nearly black, are obliterated by smoke. No doubt during wet weather these shelters have often been inhabited by natives, indications of whose visits are left behind in the shape of ashes and cinders, and a great number of quondong stones strewn over the floor.

"I have made copies of the best-preserved and most interesting designs, many of which occur repeatedly. Such an enormous number of birds's tracks are everywhere represented, that it almost seems as if this design has been the one to try the brush upon first. The copies are kept, as near as possible, in proportion to one another, and are reduced to about one-twelfth to one-sixteenth of their natural size. The colors are white and dull red, produced probably by pipeclay and ochre.—*Arcoeillinna Wells, 25th May, 1891.*"

Plate 9.

The kangaroo and bird-tracks, of the latter mostly those of the bustard and one of an emu, are easily recognisable; and so are the snakes, one with a dilated head near the left upper corner and the other without a head near the lower corner on the same side. Another representation to the right of the upper snake is undoubtedly meant for a fringed apron, as is worn by some tribes

after certain rites have been performed upon the wearer. The large white design in the right lower corner may perhaps have been intended to represent a kangaroo. It is a very old painting, and was much obliterated, and, as will be seen, is painted over with bustard-tracks. Four of the red designs may probably represent shields, but as it is doubtful whether the tribes living near the place use shields, and if so scarcely any of that shape and dimension (presuming that they were a representation of or about their natural size), this remains an open question. As far as I know, only the tribes near Adelaide and those living about the mouth of the Murray had wide shields something like the paintings they represent. Wide shields are also used by the coast natives of Northern Queensland. But how could the painter have become acquainted with this shape? The drawings, it may be said, are probably produced by an ambassador of the tribes that have shields like them, either as a memento of his visit, or to illustrate these objects to the tribe visited by him. Even this is scarcely credible, and therefore I must leave them unexplained, together with the other peculiar representations. Circles, and circles within circles, are of very frequent occurrence, as will be seen later on, and have undoubtedly a symbolic meaning, which it is hardly safe to speculate upon. The divided white oval with cross bars will also be referred to later on.

Plate 10, *a*.

"About two and a-quarter miles to the n.n.e. from Arcoeillinna the Wa-Wee rockholes are situated. These are basins in the bed of the watercourse, and are likely to hold water for a considerable time when once filled. The neighborhood has been the camping-place of natives from time to time, traces of whom are abundantly perceptible. In the sandstone cliffs close by are found a number of cavities fit for shelter, some of which contain paintings. But only those in one of the largest are worthy of note; in all the others only bustard tracks are found. The cavity opens to the south, and is only a few paces wide, and about four deep, but not high enough to stand up in. Mr. Streich copied some of the drawings yesterday, of which I have taken a tracing. They are done with red ochre."—26, 5, 91.

The readiness with which the blacks adapt already existing outlines to their intended designs is here particularly well exemplified. A natural depression in the rock resembling the shape of an eye is utilised to represent that organ, and the adaptation is certainly a success. Another such adaptation (not represented) was noticed in a similar cavity close by, where the cracks and cleavages formed irregular squares on the uneven surface of the rock. These had been margined with red lines, and

represented a large turtle. A representation frequently met with is a snake about to enter a natural crack. On this plate we see a snake going towards what seems to be intended for a crack. The design near the bottom represents a much enlarged centipede, and so probably is the one above it, but it is more clumsily executed. Besides a kangaroo and two bird-tracks, easily recognisable as such, the other designs are abstruse ; but a certain elegance in their execution is very striking. Here the circle within circles is also met with.

Plate 10, *b*.

These marks were found on the flat face of sandstone at Camp 12 on the western side of the Coffin-shaped Mountain (a sandstone ridge, so named on account of the resemblance to a coffin from the distance), near the base of a narrow precipitous valley, and about a chain below a small water reservoir under an overhanging rock.

The marks are very regularly drawn, particularly the largest of them, and in my opinion were put on the rock to mark the place of the water.

The barred oval mark on Plate I. is most likely intended to convey a similar meaning.

Plate 11.

The drawings represented on this plate are placed in the same relative position as they were found, and reduced to about one-twelfth of the original size.

The uppermost, no doubt, represents a huge snake, and the one just below to the left is a splendid representation of an iguana. Neither have a head, which I notice in most cases is omitted or hidden when reptiles are represented. The two imperfect human foot-prints have undoubtedly been produced by placing the foot, previously smeared with the pigment, against the rock-face ; it will be noticed that they are both prints of the same foot, namely, the left. Two other designs are easily recognisable as representing baskets ; both are excellent drawings, particularly the one to the left, which is beyond dispute the best representation of an object found amongst the whole series reproduced. Whether the perspective of this drawing is produced intentionally, or is merely the result of an accident, cannot be decided positively, but I incline to the last supposition. Perspective, although sometimes applied without any particular knowledge of the rules, is generally the stumbling-block of amateur artists ; the want of a correct application, and often a total absence of it, characterises their attempts at reproduction. Even such an advanced nation as the Chinese were entirely ignorant of perspective, until photography made them cognizant of it, and they now apply it at times, though

they are probably still unacquainted with its principles. Children's drawings are always "flat," because they try to draw things as they are, and not as they appear. However, admitting that the special peculiarity of the drawing is merely accidental, it cannot be denied that the lines are extremely graceful, and must have been executed by a practised hand.

Again the circle-within-circle design is met with, besides two other delineations, that challenge explanation.

These drawings are from an extensive rock-shelter near the soakage at the base of Mount Illbillie, and depicted upon granite.

Plate 12.

The locality of these remarkable paintings is about 30 miles to the south from Camp 4. This point is the termination of a low sandstone ridge, which, starting at some elevated ground to the north, extends a few miles into the sand-drifts which cover the greater part of the country. The ridge wedges out, so to say, both horizontally as well as laterally; and at its southern end has a very distinct, almost central depression about a chain wide, which is flanked by more or less vertical escarpments for some distance on both sides. Near the end of one of these escarpments facing the west, the paintings are exposed on a very flat surface of yellowish-grey sandstone. They cover about 12 feet of a plane surface over six feet high, and are in splendid preservation, which is particularly remarkable on account of their complete exposure to wind and weather. As will be seen, three colors are used in their production—red and white, previously met with, and black. This black color is probably produced with powdered charcoal, and as it will not form a pigment with water, fat must have been employed with it. It is not improbable that in this case fat was also used with the other colors, because of their fine preservation, which could hardly be expected if they were only mixed with water.

When my eyes fell upon this painting, the impression it made cannot be otherwise described than that of delightful surprise, and considering that it was quite an unexpected sight, after several days journeying over sandhills, this break in the monotonous landscape produced a charm and flush of excitement that was not previously experienced.

That this is the finest sample of aboriginal iconism met with during the journey of the Expedition cannot be questioned, and probably nowhere else in Australia has anything superior yet been found.

No satisfactory explanation of these figures can, however, be given, save that a few are intended to represent snakes, and that the rows of bustard-tracks cannot be mistaken. All others are

incomprehensible: but that they were not executed simply for idle sport becomes more evident the longer one looks upon them. They probably possess a symbolic meaning, which I confess myself unable to elucidate. I must, however, here express regret that in former times, when on account of the greater number of natives, the opportunities for observation were vastly more promising than they are now, so little information has been acquired as to the ideas of the aborigines, and the meaning of their peculiar markings. The best chances of elucidating these symbols are now, alas, almost hopelessly lost, because wherever similar peculiar markings are met with in other parts of Australia which might perhaps furnish a key to the rest, nobody is left to translate them. The few living remnants of the numerous decayed tribes have either entirely lost all knowledge of the meaning of these markings or have become, through contact with the white population, so addicted to lying that their evidence is entirely untrustworthy.

The preservation and correct reproduction of everything at present obtainable may yet do something towards solving the question, Whence the aborigines of Australia? But this task would be incomparably lightened if the true significance of these tokens could be obtained from the authors themselves. Correct information about these matters and a comprehensive knowledge of the language, together with an accurate understanding of their traditions and mythology, are the most promising factors in the solution of this problem, to elucidate which ought to be considered not only in the light of a highly interesting anthropological research, but also a duty we owe to the previous owners of this continent, as well as to our descendants.

Close to Camp 4 some paintings existed on the face of an overhanging rock, but I have not noted any particulars about them. I was promised that they should be copied during my five days' absence from camp, but it was neglected. On the dioritic dyke that crests the ridge of the granitic range lying about two miles to the south, I noticed two rings, about eight to ten inches in diameter, the outlines of which were about a quarter of an inch wide, chipped or scratched on the flat face of a block of this hard rock. On the dioritic dyke at the top of Sawback Hill two or three marks like a "broad arrow" were observed to have been worked into the rock. These I have not seen, but they were probably intended to represent emu-tracks.

Plate 13.

"About five miles s.-w. from Camp 6, at the first rocky hill, paintings were noticed on a rock-shelter facing us as we came along. I made a hurried sketch of them. They are done with

a certain freedom of hand that makes them very interesting. The rings, which are done in red ochre, are executed with particular care. Close to the rock-shelter is a small waterhole, and further along in a rent is a larger one of about seven feet in diameter."

The foregoing are my notes made on the 22nd June, 1891, which give a fair description of the locality.

Here again three colors have been used, which are retained in the facsimile reproduction of the drawings.

Excepting the two huge snakes at the bottom of the plate, the only realistic representation is the black design to the left, which depicts a branch with leaves.

About the black figure to the right of the branch, it has been suggested to me that it may be intended for a rider on horseback. This is not improbable, because this part of the country is close to where several exploring parties have passed along, and consequently some blacks must have seen a rider, and this would no doubt create a deal of discussion, and might easily have led to an attempt at illustration.

The other designs I can only comment upon as far as their execution goes, which it will be acknowledged is excellent, and shows a deal of skill. The accuracy with which the rings are finished, and the freedom of sweep with which the principal lines of the design to their right are formed places the drawings amongst the best of their class.

This completes the notes on the rock-paintings, which, it will be observed, were found, with one exception, within a comparatively limited area. The exception are the circular marks found near Camp 12, which locality lies probably within the territory of the Blyth Range tribe. If the highest elevation of the Everard Range is taken as the centre, the localities all lie within a radius of 75 miles, and the paintings are, therefore, probably entirely attributable to one tribe, namely, the Everard Range tribe, as I have called it from ignorance of their correct tribal name.

A comparison of these paintings with those from other localities and produced by other tribes, I feel certain, will prove an interesting and instructive study. I hope, therefore, that some iconographer better qualified than myself will succeed with the aid of other available material in interpreting their significance.

ETCHINGS ON BARK.—WORMA.

The etchings on bark, of which three representations are given on Plate 16, were obtained at the Fraser Range, the only place at which they were noticed.

These etchings are of special interest as a proof that the desire,

noticed amongst aborigines in all parts of the globe, to figure natural objects is also inherent to the natives of Australia. They have no particular meaning beyond the attempt at imitation; but because flat rock-faces and rock-shelters are not available in this semi-desert land, it seems to me that these slips of bark are adapted by the talented of the tribe to display their skill upon. From the explanation given to me by the native who made the etchings, or at least who possessed them, the artist intends to be a landscape painter. No. 1 he gave me as representing his "country," which means probably the hills and valleys of the Fraser Range. In No. 2 the principal figure represents a tree, and No. 3 is intended for another part of the country.

There is this broad distinction between the rock-paintings and the bark-etchings, that in the first case single objects only are selected for representation, whereas in the bark-etchings an attempt is made to reproduce more complex subjects.

The markings are produced by means of a stylus of hard wood upon the freshly-peeled bark. (See "Worma" in Vocabulary.)

CARVINGS.

Under this heading I also include the markings by charring with a pointed ember, the execution of which I observed on several occasions at the Fraser Range. I have seen Kondells, Tallas, and Unains marked in this way, and, as far as my experience goes, this method of ornamenting is the one most prevalent amongst the tribes met with at the South-Eastern point of our journey. The Balgas are frequently only jaggedly incised by means of a sharp stone, without the least attempt at design. The markings of the message-sticks, when not made with a pointed ember, are cut with a sharp-edged piece of flint, and sometimes very fine lines are produced in this way, as shown in fig. 3, pl. 15. None of all this carving can be regarded as very artistic.

It struck me as being very remarkable that not a single implement or weapon found with any of the aborigines met with from Everard Range to Fraser Range was in the least ornamented with carvings of any kind, with the exception of a Yilbar seen near Fraser Range.

Further North, however, and particularly in the Murchison District, nearly everything I saw was more or less carved, except the spears and the boomerangs; but having seen only four boomerangs altogether, I will not assert that they are always without engraving. Not only is carving very common among this tribe, but the designs are mostly of very superior execution, and often very regularly outlined. The two Meros (pl. 14) are very good examples, particularly No. 3, and the shield (pl. 18) is perhaps one of the most accurately finished pieces of native workmanship that can be found.

The Yilbars represented on plate 17 all show various designs, which are more or less carefully engraved upon them, and are very probably each made by a different native. These implements, which are only used during the performance of secret rites, and are afterwards carefully hidden from the sight of women, have undoubtedly each belonged to a different native. Seeing so many various designs, it seems that these are the particular choice of the individual, which no one will copy, as it is, so to say, the invention of the owner, and his special mark. The ownership of each Yilbar would probably be known to every adult male of the tribe by the particular markings on them.

That any special symbolic import is attached to the engravings on the Yilbars does not seem to me very probable, because there is no distinct repetition of any design to be found upon them; all that they have in common is a kind of leaning towards a zigzag character in many of the carvings.

Speaking from memory only, I think the Yilbar seen at Fraser Range was not nearly so well carved as the Murchison examples.

That there is such a marked difference in the development of the tendency to beautify their goods and chattels between tribes that live under much the same conditions, and have so many identical rites and customs, is rather an extraordinary fact. It must be considered a proof of an intellectual superiority of the Murchison tribe, which their manners and customs would not otherwise indicate.

The Weapons, Implements, and Utensils

Seen with the different tribes encountered during the journey: with descriptions.

1. Warrina. Wangarabunna tribe.

At the Camp near the Warrina Creek I observed some blacks engaged in making boomerangs. Sitting on the ground with the left leg turned under, they hold the piece of wood to be worked at by one end in the left hand, resting the other end on the ground, where it is grasped between the big and the other toes of the right foot. Whilst held in this manner the piece is shaped by means of a stone chisel held in the right hand, the arm being steadied at the elbow against the knee of the right leg.

All the boomerangs I saw were of the large kind, such as are used for throwing along the ground, and sometimes called fighting boomerangs. The blacks had none of the smaller, more bent kind, used for throwing in the air, and which return to the thrower.

The weapons and implements observed are:—

Spear, made of a thin stick of hard wood in one piece about

eight feet long, with a single barb fastened near the point with sinews from the tail of a kangaroo. At the opposite end a hollow allows the weapon to rest against the hook of the spear-thrower.

SPEAR-THROWER, over two feet long, plain and narrow.

BOOMERANG, large kind.

DIGGING-STICK, *Wadna*.—This is frequently called yam-stick by the whites, and the commonest implement in use by the blacks. In fact, it is their constant companion, more particularly that of the women, when collecting food. It is merely a smooth stout stick about four to five feet long, slantingly thinned at one end, with a rounded point, which is well hardened in the fire. It serves for digging up roots and tubers, and for dislodging snakes and lizards from the ground.

CHISEL, *Kandru*.—Described and figured elsewhere.

FOOD-BOWLS.—A small kind made of wood.

OCHRE.

TWISTED-HAIR STRING.

I paid only a short visit to the native camp, and intended to return to obtain all the names of these articles, besides other information, but was unable to do so.

2. EVERARD RANGE TRIBE.

SPEAR, *Winda* (Pl. 16, figs. 4 and 5).—Two kinds: the one with a barb near the point, and the other with a smooth, flattened, and pointed head of hard wood about eight inches in length fastened to them. Some of the shafts are whole, and others made of two pieces, and spliced together. Sinews are used for the splicing of the shafts and the fastening of the barbs, &c.

SPEAR-THROWER, *Mira nakata* (Pl. 14, fig. 1).—In shape this implement differs considerably from all others of its kind. It is slightly curved backwards, convex at the back, and deeply concave on the upper side. On account of this hollowness, that will allow the spear to lie perfectly free between the hook and the hand, it is probably better adapted for its purpose than any other known. Length about two feet two inches, width three and a half inches in its widest part, narrowly tapering towards the handle. The hook is fastened with sinew and cement, and at the other end a piece of flint, that serves as a chisel, is attached with a lump of cement, which prevents the hand from slipping when the spear is thrown. The implement, it will be seen, serves for making weapons and tools, as well as for flinging the spear.

CHISEL, *Iduru* (Pl. 14, fig. 5)—A sharp piece of flint about an inch wide fastened with cement.

THROWING-STICK, *Turtimba*—generally shortened to *Turti* (Pl. 14, figs. 6 and 7).—A stick made of heavy wood about 22 inches long and three-quarters of an inch in diameter, slightly

curved and notched on one end for a handle. With the Everard Range tribe (as well as those encountered further west) it seems to take the place of the boomerang, which I never saw with them. It is a constant companion of the men, who frequently carry it under the hair-cords they wind round the body, and is used for killing small game.

Digging-stick, *Wanna.*—This and the next they always carry with them.

Food and Water-bowl, *Wera.*—A small shallow wooden bowl, mostly less than a foot long, and frequently used for scooping the earth away after it has been loosened by the wanna.

Food and Water-bowl, *Mika.*—A large deep oblong water-bowl made of solid wood gouged out. It must take the natives a long time to make one (*vide* photograph of wurley, pl. 30).

3. Blyth Range Tribe.

(Seen between Camps 15 to 20).

The weapons and implements observed with this tribe are almost identical in shape and make with those found amongst the Everard Range tribe. I noticed the following :—

Spear, *Windu.*

Spear, *Kujarra.*—A small spear, made for boys to practise with.

Spear-thrower, *Meru.*

Chisel, *Wanne.*

Throwing-stick, *Turtimba, Turti.*

Digging-stick, *Wanna.*

Small Water-bowl, *Wera.*

Large Water-bowl, *Yilgalla.*

Stone for Grinding Ochre, *Abu.*

4. Barrow Range Tribe.

The blacks who visited us at Camp 33 carried throwing-sticks, and some also spears. Those who visited our camp near Mount Squires carried only throwing-sticks, with the exception of one, who had a barbed spear. The weapons were of the crudest make.

5. Victoria Desert Tribe.

Those met with near Camp 40 by some of our party were not seen by me, but I was told that they carried spears and spear-throwers.

Some blacks were surprised by our party near a waterhole between Camps 43 and 44. These had spears and spear-throwers like those found with the Everard Range tribe, besides some throwing-sticks. Near the waterhole they had left a number of large water-bowls, some of which were made of thick bark, which

was evidently displaced from a convenient outer bend of a large eucalyptus tree. A circular pad for carrying these bowls on the head was also found. It was excellently made of twisted (opossum ?) hair-string. Near Camp 33 several similar pads made of grass were found, which is evidence that the native women have to carry water with them when the tribe is on the move, and that they carry the bowls on the head.

6. FRASER RANGE TRIBE.

SPEAR, *Kadji, Winda.*—Barbed like those of the Everard Range tribe.

SPEAR-THROWER, *Meru, Wordat.*—Plain and straight (Pl. 14, fig. 2).

BOOMERANG, *Kaili, Wallena.*—Both the large and smaller kinds were seen by me, but not often. It seems that this tribe, like those met previously, have little use for them. Neither kind was well finished ; the smaller curved rather wider and clumsier, and the larger kind much lighter than is usually the case.

BULL-ROARER, *Yilbar, Kundain.*– This oval instrument is used at some of the secret rites for the purpose of making a whirring sound, whence the name given it by Europeans. Those seen were the only articles ornamented with carving observed by me from Warrina to Fraser Range except the following smaller objects.

NOSE-STICK, *Kondell, Wondarra* (Pl. 15, fig. 2).—Some of these are over ten inches long, and fully three-eighths of an inch in diameter. The ends are usually ornamented with lines winding round them, which are produced by charring with pointed embers.

MESSAGE-STICK, *Unnain, Vergu* (Pl. 15, fig. 3).—The hieroglyphics are produced with a pointed ember ; or by scratching with a sharply pointed, hardened piece of wood, pointed bone, or sharply-edged chip of flint, and then rubbing the incisions over with ochre. Very fine lines are produced by the stone-chip, as is shown in the figure.

HAIR-FASTENER, *Talla* (Pl. 15, fig. 4).—Used for fastening the hair when forming the chignon-like knob at the back. From four to six inches long, oval, and pointed on both ends, often curved, and always ornamented with scratches or rings. Generally they are made of Yauwilli (Acacia sp.), but sometimes of bone.

FASTENER, *Balga, Dalgerri* (Pl. 15, figs. 5 and 6).—Narrow, notched, and ornamented sticks made of hard wood ; used as hair pins, and for boring holes in skins, &c.

HEAD-ORNAMENT, *Yindinga* (Pl. 15, fig. 1).—Made of green, soft-timbered sticks, which are shaved down, and the fine shavings left attached at one end to form a ball at intervals. This ornament is used at dances and corrobories. I have also seen a piece

of it, broken near one of the balls, used as a brush to paint with.

FOOD- OR WATER-BOWL, *Yari*.—Large, made of wood.

FOOD- OR WATER-BOWL, *Moya* (Pl. 16).—This is made of thin mallee bark, which is gathered up at the ends and tied with bast. To accomplish this, I think the bark requires sweating in order to make it pliable, as the green bark is rather brittle, and would surely crack if the bending of it were attempted without some preparation.

ETCHINGS, *Worma* (Pl. 16).—These etchings on the inside of thin mallee bark are made with a hard sharp stick (*Dalgerri*) when the bark is green. The air discolors the scratchings, which become yet more visible through the gummy sap accumulating in them, and coagulating into minute globules.

HAIR-TWIST, *Kāda namba*.—This is made of human hair and very strong. Used for tying up the hair and for winding round the body as a belt.

7. MURCHISON DISTRICT TRIBE.

SPEAR, *Kulba*.—A plain thin kind with a single barb.

SPEAR-THROWER, *Mero* (Pl. 14, figs. 3 and 4).—These are of the general style, as found near Fraser Range, but much more carefully made. The underside is convex and smooth, but the upper flat, and generally very neatly carved, and covered with ochre.

BOOMERANG, *Kaili (?)*.—I saw both the smaller curved and larger less-bent kind, but none of those seen were proportionately so well finished as their other weapons.

CHISEL, ? (Pl. 14, fig. 5).—Excellently made as a rule, and regularly corrugated the full length from the handle.

THROWING-STICK, ? (Pl. 14, figs. 6 and 7).—These are always always made of very carefully-selected wood that will never show the smallest rupture afterwards. They are notched at the handle and either smooth or fluted.

? ? (Pl. 14, fig. 8).—The use of this peculiar implement I am unable to give. It is nearly two feet six inches long, rather thin, convex at the back, and flattish on the carved side. Originally it may have been intended for a Yilbar (although of extraordinary size), but was left unfinished for some reason, as it has not the necessary hole. For a weapon it is too light. The carving is scarcely as good as is generally found on other implements.

BULL-ROARER, *Yilbar*, *Kundain* (Pl. 17)—The series of these vary from 10 to 29 inches in length, and from one and seven-eighth to three inches in width. All are more or less convex at the back and flat in front, elliptical, with a blunt edge all round. Each of them is carved in front with a different design, varying in accuracy of execution. The longest specimen is an abnormal

type, and, besides, is made of the least carefully selected wood in this series, as the flat surface has several wavy depressions. The others are fairly flat, but some slightly twisted. One specimen has been mended with resin-cement at the place marked with a ×. All have been covered with ochre rubbed on in a dry state.

Shield, ? (Pl. 18).—It is made of hard wood, two feet three and a half inches long and six and a half inches wide, slightly convex in front, and correspondingly concave at the back. The ends bend backward about one and a half inches, so that a straight line may be drawn from the ends over the back part of the handle; elegantly shaped and worked down to an average thickness of a quarter of an inch, which is gradually increased towards the handle, but slightly thinned towards the margin. The front is deeply and regularly grooved, and painted alternately white and red; the back is less regularly and more finely grooved, and colored completely red. The workmanship and finish is superior to anything I have seen produced by the aborigines of Australia, and the pigments must have been applied wet, as they adhere much more firmly to the wood than usual when applied dry. This kind of shield appears to me completely worthless for the purpose for which such an implement is generally intended to be used. Its extreme thinness and lightness, together with the want of tenacity of the wood it is fashioned of, makes it unfit to resist a waddy or a club; a single blow from either would send it into splinters. Even against a spear it cannot be a protection, because a stroke from one, unless it glanced off, would be likely to split it from end to end. It seems to me almost as if it were intended more for an ornament than for use, and if the aborigines obeyed a chief like other crude peoples, I should be inclined to consider it an emblem of authority. These thoughts occurred to me on carefully examining the shield for description, when I noticed that it had suffered considerably since it came into my possession, although I believed it to be packed fairly well, together with some other things.

Bone Nose-stick, ? (Pl. 15, fig. 8).

Bone Needle or Awl, ? (Pl. 15, fig. 7).

Digging-stick, ?

Small Wood Food- or Water-bowl. ?

The last two implements are the constant vade mecum of the women. (The names of the objects queried by me I am unable to give owing to a much-regretted loss of a portion of my Murchison vocabulary.)

Besides the absence of boomerangs amongst the natives encountered during the earlier part of the journey, after leaving Warrina, the absence of clubs, shields, and stone tomahawks, which extended beyond the Fraser Range, was very

noticeable. It is easy enough to account for the latter, because where there are no large trees to climb, and no rivers to cross, and consequently no demand for boats, the tomahawk is an implement not much required, and for the chipping of their weapons and implements, the chisel is probably sufficient. But for the absence of shields and clubs I am at a loss to account, except that these tribes are so extraordinarily peacable that they do not fight at all, or very rarely; or that they do not use the spear to fight with, or ward it off in some other way than with the shield. A number of spears were found hidden under some rocks not far from Camp 15, but shields were not seen there. The blacks whom we surprised at the waterhole between Camps 43 and 44 had no clubs or shields with them, although otherwise fully equipped with the implements of peace and war. None of the roving lots we met ever carried either, and none were seen amongst those from the various districts that were met with near the Fraser Range.

It is not from the want of proper material that these tribes have no shields, because there are sufficient Kurra-jong trees (*Brachychiton Gregorii*) found throughout the country; and regarding tomahawks, there is nowhere lack of material for them.

Gnora is the resin of the Grass-tree (Xanthorrhea) mixed with fine sand and dust, which makes an excellent cement, that is deservedly esteemed by the natives for the purpose of fastening the chips of flint to their cutting tools, and for other things. The setting of these stones is rather a slow process, because the lump of cement used for the purpose requires to be gradually heated through to make it thoroughly plastic. If it is heated too quickly it froths up and crumbles, behaving much like natural asphalt under such conditions.

When a native wishes to fasten the stone, say to a Meru, he begins by warming the wood near the handle, and then attaches a lump of the cement to it, which is slowly warmed through over a few embers and hot ashes. After the stone is inserted into the cement, the warming is further continued, and the soft mass pressed into shape with the fingers: before that, however, it is moved over a small heap of dust and dry earth, scraped together for the purpose, partly to prevent the cement sticking to the fingers, as well as with the object of working more fine particles of earth into it. This manipulation is continued for some time, until after reapeated warmings the stone is well imbedded, when it is allowed to cool. The stone sticks very firmly after that, and rarely comes out till it is removed for the purpose of being replaced by a sharper piece.

The hooks of the meru and the barbs of spears are also set firm with a little gnora, after they have been well tied with the sinews from the tail of a kangaroo or wallaby.

In the Victoria Desert I found on one occasion a great deal of this cement at the base of some large grass-trees, standing on the ridge of a sand-dune. The trees had been on fire some time before, and the resin had oozed out, and accumulated near the root whilst soft, and when in this condition a deal of sand had been blown on to it, thus forming cement.

At the Fraser Range the blacks were very pleased when I gave them some of this. From the delight shown by these natives at obtaining this cement it appears that the trees must be of rare occurrence in their district, or that they can only obtain the gnora by means of barter from some other tribes.

The Murchison tribes use ochre freely for painting the weapons and implements. Apparently that substance is found abundantly in their district, hence its frequent application. At the Fraser Range I noticed that the natives use their own blood for the coloring of small things, such as Talla, Unain, or the interstices between the balls of the Yindinga, and other ornaments. To obtain the blood they nick their thighs with the sharp edge of a small chip of flint, which makes the blood flow gently, and generally form large beads over the incision. The articles to be colored are rubbed over the wounds on the thigh, and the blood is afterwards more carefully spread with the tip of the finger. As the incisions are not made very deep they soon close up when the blood begins to coagulate, and for this reason it often requires a great number of cuts to color a single article.

It is noteworthy that *red* (the color of blood) and *blood* go by the same name, viz., *yurnin*.

Notes on Various Customs, Ceremonies, &c.

Obtained by information from reliable sources.

From Mr. J. B. Beck, mounted constable at Warrina, who for many years has frequently come in contact with the aborigines of the interior, I obtained the following interesting observations :—

Among the Diyeri tribe at Lake Hope, Cooper's Creek, the following custom prevails :—

Interdum quinque, sex, septemve adolescentes mulierem conducunt ; aut "yinka" (funem capillis humanis factum) aut telum aut aliud nescio quid pro soluto dant. Tum in casam, cui nomen "wurley" datur, pæne ducentos a tectis passus ædificatam, mulierem inducunt ; deinde sortiti deinceps casam ineunt ; postremo egresso, primus redit : hoc usque ad primam lucem facere solent. (A case like this has come under Mr. Beck's own observation.)

To make the swans lay a corroboree is held, during which two

of the oldest men of the tribe take each a sharp fish-bone and pierce it right through the scrotum. They consider this piece of sorcery specially powerful to induce the swans to lay. (This information Mr. Beck obtained from some of his blackboys, whom he considers perfectly reliable.)

To make rain the following disgusting ceremony or scorcery is performed :—

Plurimi se violare solent; semen in alveum collectum, aqua farreque (cui nomen "nardu" datum) miscent; quod deinde vir quisque edit. (Obtained from Mr. Beck's black boys.)

When they are about to exercise the rite of circumcision, or the "terrible rite," they proceed as follows :—A black lies down on the ground face downward, another lays himself on the first face upwards, and a third upon him again face downward. On these three the young man is thrown, and held by the hands and feet whilst the operation is being performed. (Also by information of the black boys.)

The superstition of pointing a bone to make someone ill and cause his death is believed in by this tribe. All illness is invariably attributed to the illwill of an enemy who has pointed a bone at the victim, whose body it has entered, and is lodged where the pain is felt. If no medicine-man sucks the bone out, death is almost certain to take place. When this happens the relatives of the dead go to the tribe whence the bone is supposed to have come, and slay the imaginary murderer. This, of course, leads to retaliation, and a feud of long duration, or even perpetuity.

The following information was furnished by Billy Weaver, an intelligent half-caste living at Warrina, but who was born at Port Lincoln :—

TERRITORY OF TRIBES.

The territory of the *Andijirigna* extends from Alberga north to Mount Eba south; to the west past the Musgrave Range, and in the east it joins the territory of the

Wungarabunna, which extends north from Oodnadatta to Strangways Springs south; east to Lake Eyre, and west to Cootanoorinna. The

Diyēri extends from Salt Creek north-west of Cooper's Creek to Hergott Springs south; east to Lake Hope, and to the west joins the Wungarabunna territory. The

Kukatha joins the Andijirigna, and extends from Port Augusta north to Poonindie south-west. The

Kuyanni joins the Diyēri, and extends from Hergott Springs north to Beltana south. The district of the

Wonkongnúru lies round Salt Creek, and joins the Diyēri in the north. The

Gnámeni live to the east of Salt Creek, and join the Wonkongnúru and Diyēri tribes. The

Yandruwuntha territory joins that of the Diyēri tribe at Lake Hope, and goes south as far as Strzelecki. The

Wungaranda joins the Wungarabunna and Andijirigna tribes.

PUDNAPA AND YERUPA.

Circumcision and subincision are practised by the following tribes, viz., Wungarabunna, Diyēri, Kukatha, Wonkongnúru, Gnámēni, Yandruwuntha, Kuyanni, Wungaranda, Andijirigna, and the tribes near the Barrier Range, and probably also on the Murray. With all these tribes the Pudnapā and Yérupā is compulsory, and in cases where young fellows have been brought up with whites they have been taken by force for the purpose of having these rites performed upon them.

On the Diamantina lives a tribe that circumcises, but does not subincise. Weaver lived for some time amongst them.

Pudnapā is the name given by the Wungarabunna to the rite of circumcision, and Yérupā to subincision. Both these rites are performed in secret, and with the strictest exclusion of the women. The operation is performed by some old men, chosen for the purpose, with a sharp stone, which is afterwards buried. Any other thing but a sharp stone is considered poisonous. Weaver tells me that he has been present at two of these ceremonies, although the blacks will scarcely consider him one of their own. He is certain that no white man would be allowed to witness these rites under any consideration. The last he witnessed was performed a few years ago not far from Warrina, at the North Creek. A corroboree was kept up for about a week before the operation was performed. During the forenoon the men had their dances, &c., and at night the women also. Previous to the rite, the women were all driven out of the camp. The young man was laid on the ground and his arms and legs held, whilst the old men performed the operation with a sharp stone. This being done, a signal fire was lit to announce that all was over, and then the resumption of the corroboree finished the ceremony. After the incision some opossum hair is placed in the wound, which is then allowed to heal. This process takes some time. The patient is removed out of sight of the women, and has to keep away from the camp until he gets well. Food is procured for him during this time by someone who is told off for the purpose, but who is relieved from time to time.

These ceremonies are called Wilyuru, which signifies the elevation of the youth into manhood, and are generally performed between the 14th and 16th year, and, in cases where the youth may have worked for some white men, at a later age.

I inquired of Weaver why the blacks observed these rites, but all he could tell me was that by these ceremonies the youth were made men, and without these operations they would not be considered such. He has since made some enquiries of the blacks camping near Warrina, and these give it as their opinion that it is now considered a safeguard against certain diseases, but formerly was done to raise the individual undergoing these rites from youth to manhood.

These answers not being satisfactory, I asked him whether it was not done to prevent over-population? He answered me that all were cut that way, unless brought up by whites, and that the operation did not prevent the impregnation of the female. Expressing my doubts on this, he said that he was quite certain on this point, and that the blacks performed the act of coition in a different manner to the whites.

Hic mihi enarravit quomodo se ponant. Mulier ut videtur, corpus ita ponit ut vir, genibus suppositis, manibus lumbum prehendere possit: unde fit ut genitalia quam proxime conjungantur; eo modo fieri potest ut semen in vaginam introire possit.

"Yérupā" means a slit. The organ of the female is therefore sometimes called by that name, although the proper name for the vagina is pintha.

The names of the sexual organs are as follows:—

	Male.	Female.
In the Wungarabunna ...	Wunthu	Pintha
" Kuyanni	Wurri	Bidlī
" Kukatha } ...	Kāla	Kuna
" Andijirigna } ...		
" Diyēri	Kuni	Kula

The tattooing of the arms, chest, and back, as a rule, is done after the yérupā has been performed; occasionally, however, before it. It is considered a final ornamentation of manhood by most tribes.

The ceremonies called Wilyuru are known by this term amongst the Wungarabunna (Warrina), Kukatha (Port Lincoln), Kayanni (Beltana), Andijirigna (West), and others.

LAWS AND CUSTOMS OF MARRIAGE.

Closely related marriages are prohibited.

Mattari and Karrari are the terms used to distinguish the leading strains of blood. How these are determined I could not get explained, except that they must not marry in the same strain, but Mattari must marry Karrari, and *vicé versâ*.

Marriages, besides taking place in the same tribe, may also be contracted between these two strains of blood with other friendly

tribes in case one or the other of them should predominate here or there.

Polygamy is permitted, and customary, but a blackfellow has seldom more than two wives.

A married black will sometimes send his wife to his brother who has no wife of his own.

Adultery, which often takes place, if, for instance, some fellows leave the camp for a time, is punished by thrashing the woman, whilst the man goes unpunished. Should a woman be killed by too rough a beating, nothing follows, unless her relatives take it up, and then, perhaps, kill the slayer. However, this occurs rarely.

Women retire from camp if about to give birth to a child, and are attended by other women. For about 10 or 12 days afterwards they keep away from their husbands. During menstruation the women sleep apart from the men, but are not entirely secluded, only coition is prohibited. They wash themselves freely during this time.

A FEW OTHER LAWS.

Tribal boundaries are strictly acknowledged, and if overstepped the act is considered as an aggression.

Property is only personal, and consists of the weapons, tools, and utensils of the individuals. No one has any special right to certain lands, which are all held jointly on account of the tribe, as against another tribe.

The annexation of a weapon or utensil is not considered a crime, but must be compensated for or returned. (It seems to be, therefore, a sort of borrowing without permission from their point of view.)

BURIALS.

The dead are buried in the ground. When a blackfellow dies he is rolled in a blanket, or some other covering, and left stretched out in the wurley till a hole is dug. If the ground is soft the hole is sunk to five or six feet, and even deeper. The body is then placed alongside the hole, and speeches are made over it, wherein his deeds are related and his virtues extolled, which speeches may last perhaps for hours. A great deal of wailing and lamenting is also carried on over the corpse, particularly by the women. After the body is put in the grave green boughs are placed upon it, and the hole filled up to about two feet from the top. In this state the grave is left for about a week or two, and is then filled up with sand. A small mound may be formed, and then trees and bushes are placed lengthways over it, and the place round it is levelled and cleared. For a few weeks the grave is looked after by the women, and sometimes the old

men may visit it, but after that it is avoided and never passed in the dark. As a rule the body is buried near the place where death occurred if a high and dry spot is convenient. The tribe always shifts camp after a death has taken place, and never bury more than one corpse in the same place.

This custom of burial prevails among the Wungarabunna, Diyēri, and Kuyanni tribes.

NOTES ON VARIOUS SUBJECTS.

In the Wungarabunna dialect the chisel used for making boomerangs and other tools is called Kandru. This is a stout, slightly-curved stick of hard wood about two feet and a half long, to which a sharp stone about an inch wide is attached with cement. It also serves at times for throwing at game, or instead of a waddy, but is mainly used as a tool. The name of the stone is Thula, and the cement for fastening the stone is called Kundi. This is made from the gum of the grass tree (Xanthorrhea), which does not grow nearer to Warria than Cooper's Creek, whence it is obtained by the Wungarabunna in exchange for other articles. The best of it is obtained from old trees near the base of the trunk and from the root. It is extracted by heating these over a slow fire, when the gum oozes out, and afterwards mixed with sand. The Wungarabunna sometimes substitute the gum of the Gidyea (Acacia homalophylla), and since the railway came to Warrina, Stockholm pitch for it; but none is as good as the Kundi.

To cure pain in the stomach the blacks use a shrub called "Pinpa." Green branchlets of it are placed on the embers of a fire till they are well heated through, and so are applied to the abdomen. I could not get a sample of it near Warrina, where it is scarce, but it is said to be abundant near Beltana.

Cyperus rotundus grows fairly abundantly along the sandy borders of creek beds near Warrina, the bulbs of which are much prized as food. The "Yalka," or "Yaua," as these are called by the blacks, are collected when the leaves have died off, by digging them up with the Wadna. They are about the size of the first joint of the little finger, and when roasted in the ashes or on hot stones they have a very pleasant nut-like taste.

A FEW MEANINGS OF NATIVE NAMES.

"Yauatunkinna"—a lake about 15 miles north of Lake Hope —means "stinking of yaua."

"Perrigundi"—a lake about 30* miles north of Lake Hope, and filled by Cooper's Creek—means "beautiful bowl of water."

* The distances may probably not be quite correct, but this is immaterial.

"Perrichirri"—station at Cooper's Creek—means "pretty little waterhole."

Mr. A. G. Hall, Assistant Resident Engineer at Warrina, gave me the following information :—

A few years ago a native by the name of King killed another blackfellow of the same tribe for committing adultery with his wife.

Another blackfellow of the same tribe killed a white man by hitting him with a boomerang on the forehead for committing adultery with his gin. (Compare above, p. 279, with Weaver's statement about adultery.)

THE YUNGA.

My informant is Wainbret, a native of this tribe, who understands English well, and also speaks it fairly. I met him at the dam-sinkers' camp, near the Fraser range, and was assured by those who knew him well that he was thoroughly reliable.

The Yunga is a costal tribe, the centre of their district being about Esperance Bay. The extent of their territory to the east and west I could not correctly ascertain, but they claim the ground inland to about 40 or 50 miles from the coast.

They are friendly with the neighboring costal tribes, but at feud (or were so) with the Bardoks, whom they despise (according to my informant) on account of their cannibalism.

The tribe was very numerous up to the time the measles broke out among them, which must have been between 20 and 25 years ago, for Wainbret, whom I take to be about 35 years of age, says that this epidemic made fearful havoc amongst them when he was a young man just getting his beard. Since that time the tribe has not increased in numbers again.

The Yungas neither circumcise nor practice subincision; neither do they pierce the septum of the nose, nor knock any of the front teeth out. They are, however, cognisant of these practices existing among the Bardoks.

Polygamy is unlimited amongst them, but the most have only one or two wives, and seldom more than three. A child girl is frequently allotted to her future husband soon after birth, who helps to procure food for her during her infancy. He takes her entirely into his charge as soon as she comes to the age of puberty, which is about her twelfth year, or when her breasts begin to develop. For this reason it often happens that old men have very young wives. The parents generally receive something in exchange for their daughters, some sort of useful article, but also part with them as a free gift, as they rarely object to let the girls go. Should a young man run away with a bespoken girl and they are caught both are killed. This being a well-known and acknowledged law such elopements occur very rarely.

Wainbret asserts that his tribe never practised cannibalism. This may probably be correct, because there seems to be sufficient food obtainable along the coast ; the tribe was also very numerous formerly, which may be considered as favoring this assertion, but I have noticed that the blacks as a rule deny their cannibalistic practices, at any rate to the whites. But he tells me that the Bardoks up to quite recent times indulged in this terrible practice (perhaps they do still although he thinks not), and that the knocking out of a front tooth was done after anyone had partaken of human flesh. The various tribes used to be very fond of eating young fat babies before these began to walk. The men would send the women away from camp to search for food, and during their absence knock the child on the head and eat it. Mr. E. Keenan, one of the dam-sinkers, who has been a great deal among the blacks in various parts of West Australia, corroborates this statement from personal observation, and considers it to be well authenticated by others.

NOTES MADE AT YAURIGABBIE (WATSON'S STATION), W.A.

The informant is a young native, Kuma by name, who speaks English fairly well, having lived at the station since he was a boy.

His native country he calls Yolla, which lies to the east of Yaurigabbie ; to the west the country is called Yaburru.

The name of his father was Munga ; that of his mother Bulli ; and Murdaun, Billaga, and Yanneri are the names of his three brothers.

The father names the children.

Kuma's father had two wives, and states that this number cannot be exceeded by any individual of his tribe, according to their custom. There is no ceremony about the marriage. When a young man is getting a beard, he is informed that he may take a woman. When their breasts begin to swell, the girls are considered marriageable.

The tribe practises circumcision, but not subincision ; as, however, my informant has not lived amongst his tribe since he was a boy, the last part of the information may justly be doubted, particularly since he could not give me any information about the manner of burial in his tribe, and the ceremonies in connection therewith, showing that he was not acquainted with all their rites. I cannot believe that this tribe should dispense with the rite of subincision, which is so universally practised in the interior of West, as well as South, Australia, and amongst tribes by whom they are surrounded on all sides.

They do not knock any of their front teeth out.

Kuma's father died at Rottnest Island, whither he had been deported for some offence.

NOTES MADE AT ANNEAN STATION, MURCHISON DISTRICT, WEST AUSTRALIA.

The blacks of this district are characterised by some of the most depraved habits made known about the aboriginal races of Australia. Cannibalism is practised among them, and perhaps assumed the worst type because it has become such an ingrafted habit with them, that it is indulged in even without the excuse of necessity and starvation. A case related to me by Mr. Cruikshank, the owner of the station, cannot possibly be more horrible, and places the perpetrators in the worst light.

At the present time there are two blacks from Morarie, on the upper Murchison, imprisoned on Rottnest Island for killing and eating a boy of eight or nine years of age. At the time of the occurrence of this dreadful deed, the tribe held a corroboree at Yalga, and were well supplied with food, for beside their native game they had received a sheep and a bag of flour from Mr. Cruikshank. Of this, however, the two fellows did not partake but decoyed the boy away from the camp into the bush, and there killed and ate him. The boy belonged to their own tribe, and the deed does not seem to have been approved of, because the murderers were committed on the evidence of the other natives.

The women of the various tribes inhabiting this district frequently kill their young children to rid themselves of the trouble of rearing them. Not far from Annean Station a woman gave birth to a child whilst out shepherding, which she killed, and at night brought the sheep home as if nothing had happened. On one occasion Mr. Cruikshank asked a woman about her baby which he knew was ill ; she replied it was dead. But dead and ill being synonyms in their language he did not believe in the child's death and gave her a blanket to wrap it in. The next morning he found the child dead on the top of a fence and the woman gone. Whether the child had been placed in this position when still alive is doubtful, but the woman had evidently neglected it in order to get rid of it.

I have, however, noticed mothers to be very kind and playful with their children when these were healthy, and when they were sick and seemed to suffer pain place warm ashes on their stomachs and rub and tend them patiently and affectionately. It must not be forgotten that it is the duty of the women to provide food for themselves and the children, and to some extent for the men also, in fact, these appropriate whatever they like of all that is brought in. Under such conditions the children have to take their chance, and it stands to reason that they must often get badly neglected and begin to ail, when they become still more troublesome. Foreseeing this the woman may think it better to kill them immediately after birth, although with them it is not a disgrace to

become a mother—a frequent cause of infanticide among civilized people.

The fear of over-population (?) seems to preponderate more amongst these tribes than with most of the other Australian natives, for here, besides the peculiar rite they practise in common with them, they remove the nipples of the breasts of many women to prevent them suckling, a practice I have not previously heard of.

It appears almost paradoxical in the face of these statements to assert that women in confinement are carefully tended, but this is not the only contradiction that may be observed in the life and the habits of this peculiar and in many respects incomprehensible race.

When a woman is about to give birth to a child she is taken away from the men, and is attended by another woman, generally an old one, who looks after her for several weeks and finds food for her. During this time of seclusion in a specially erected maimai the men must not come near her.

No special seclusion is observed by the women during the time of their menses.

Polygamy is unlimited, but probably there are no men found with more than three wives. They generally cohabit with one of them for a time, and change to another as fancy moves them. Jealousy does not seem to exist to any great extent in either sex. The blackfellow does not like to see the woman with whom he is cohabiting at the time go astray or interfered with. About his other ones he does not trouble much, and may perhaps lend them out.

A black that worked at the station during my stay had the loan of a woman from another black who had gone away to some distant place, and she absorbed all his affection for the time—in fact, almost beyond the usual custom, for he did not even make her work, and scarcely allowed her to go out hunting. His other two women had to bring the food, supplied to them by the station owners, to their camp at night, where all four would partake of it together in the best of harmony.

All men are circumcised and subincised.

The rite of circumcision is always performed first, at the time when the young man is getting a beard. The other rite is performed about a year after. The length of the incision varies, but it is often the whole length of the organ. The most painful of these operations is the circumcision, but the healing of it is quicker than the other. To stop the bleeding and to assist the healing the down of some emu feathers is placed on the wounds.

These rites are always performed in secret, and no white man, as far as I could ascertain, has ever been allowed to witness

them. Mr. Cruikshank has given me the following description of the ceremony, obtained by him from one of his old station hands, who confided it to him.

When the operation is about to take place, the individual to undergo it is blindfolded, and three of the oldest men of the tribe are also blindfolded. One of these is then placed back to back with the young man, and, interlocking his arms in those of the victim, lifts his feet off the ground by bending well forward, and balances him on his back. The legs of the young fellow are then lashed back to the legs of the bearer, and in this way safely secured. The other two blindfolded men now approach, and remove the foreskin by means of some sharp chips of flint.

For what reason the three operators are blindfolded is difficult to tell, unless it is done to mystify the one who holds the victim up, that he may not tell for certain who really performed the operation. It may, however, only be a little extra display to lend a more imposing impression to the rite, which, as it is performed with the greatest circumspection, and the one most persistently and universally practised, perhaps some such humbugging ceremonial embellishment is deemed necessary to enhance the mystification of it.

The women, as is well known, are kept strictly away from all these ceremonies under pain of death, and to give them warning to keep away, and shut their eyes, a whirring sound is produced by an instrument that is rapidly rotated through the air. This instrument consists of an oval piece of wood from ten inches to two feet six inches long, and from two to four inches wide. It is flat on the one side, and generally elaborately carved on this, and convex and plain on the other. At one end is a hole for a thong of kangaroo hide or a twisted string of human hair, by which it is attached to a handle (Pl. 17).

The blacks tell the women that "Jinki" (the devil?) is about when they hear this yilbar sounded, and although they often know well enough that the men are carrying on some mysteries, they pretend to believe it, and partly from fear and partly from superstition take care not to inquire into the matter too closely. The women must not even look upon one of the yilbar, for they would certainly be killed if they were found to have seen one. If accidentally a woman should get sight of one, she would probably pine to death, because she has been led to believe that her doom is sealed, and that superstition is so deeply rooted in her that she would most likely succumb to what she thinks is her unavoidable fate. The yilbar is therefore always most carefully wrapped up, and hidden in a secluded place, when not in use.

For several weeks the young man who has been recently operated upon whirls this instrument whenever he thinks some-

one near, and must not enter the main camp till he is quite healed. He stays during this time at first a good deal in a maimai by himself, covered entirely from view, and is supplied with food, which is not rarely sent by one of the old women of the tribe, who, however, carefully avoids catching sight of him. In such cases she will give a signal of her approach, leave the food a little distance from the hut, and retire quickly, after having given another signal.

How deeply superstition is fastened in the mind of men and women, how eager the first are to keep it alive, and on the other hand how the women are imbued with fear, the following anecdote will illustrate :—

The wall of one of the rooms at the station was decorated with a number of native weapons and implements, and among the latter several yilbars. This was well known by the station blacks, and soon after our arrival "Jack" took Mr. Cruikshank mysteriously aside to say something to him, which turned out to be a request that the new arrivals be warned not to get the yilbars out and show them to the women. A few days later I asked "Jinny," when she was sweeping the verandah, to come into the room, but she would not, although I offered her tobacco, which would make her do almost anything else ; and when I went towards her and caught her by the hand, she threw her broom down and ran away. Some time after I told her that I would bring one of the things out and show her, upon which she immediately ran away, hiding her face. She cleaned every other room but the one the implements were in. Both these blacks had lived for several years at the station, and had been a good deal enlightened, and had altered considerably from their original ways, but so far the contact with civilization had not produced the least effect towards removing this superstition.

Marriage ceremonies they have none. The women are obtained in a similar manner as is the custom among other Australian tribes. They are allotted at their birth, or are promised or bartered later.

The burials of this tribe are very simple, and as far as I could ascertain conducted without any special ceremonies. The corpses are put underground in a shallow hole, or perhaps only in a hollow, and then covered with sand and boughs.

In one aspect the character of the natives of the Murchison District differs entirely, as far as I know, from that of most of their compatriots. It is a well-known fact that among many of the Australian tribes veneration for the aged is strongly developed, and as a rule the old people are well treated, respected, and provided with food when they get feeble. This trait excites our admiration, and compares very favorably with

the prevailing customs among other nations still living in their aboriginal state, as well even with some of those who have entered the pale of civilization and felt its harmonising influence. The manners and customs of most races teach us that they neglect the old people, and in many instances they have been treated cruelly, and have even been buried alive when they became troublesome.

Among the Murchison tribes the veneration of their aged people seems to find no place, for not infrequently they kill them when these get too feeble to procure food for themselves, by hitting them with a waddy across the back of the neck.

If, however, a woman volunteers to procure food for any feeble individual, he is left to her, and spared as long as she likes, or is able to care for him.

At the time of my stay, a case was known in the district where a woman had charge of a feeble man, living together with him apart from the others, and providing for him. But the woman was old too, and it was likely that the man would outlive her, and then would be knocked on the head. I asked the black at the station about this, who told me that the man would likely be killed, but his time had not come yet. The last part of this sentence seems to me to imply the correctness of these statements more than anything else.

It is evident that the fate of being killed only meets the man whose wives have died before him, because as long as he possesses a woman belonging to him, she is under his command, and he can make her work. There seems to me a deep policy underlying the custom of having several wives, and more yet in the practice of getting young ones.

In spite of the bad traits I have had occasion to narrate of this tribe, I cannot say that they have made an unpleasant impression upon me, and although I cannot enumerate many of their virtues, I must say that they make very faithful servants to the whites, when fairly treated. The struggle for existence in the country they inhabit is at all times very hard, and during prolonged periods of drought, which are, unfortunately, of too frequent occurrence, they must be almost continually at starvation point. The occupation by the whites of the better portion of the country makes their existence still more difficult, as it drives the native game away, which cannot live so well when sheep eat their feed up. If under such conditions a starving black is tempted to kill a sheep now and again, it ought not to be looked upon as too severe a crime, particularly when it is considered that he does not regard it perhaps as being so very wrong from his point of view, who, after all, is the rightful owner of the soil, that yielded him game for ages.

The physique of the Murchison tribes is much superior to that of Fraser Range. Most of the men observed by me were over five feet six inches high, and proportionately muscular. The women are mostly well-shaped, particularly the younger. Both men and women tattoo, the latter generally on the chest, where the scars often form bands from breast to breast. With several men I noticed the front tooth knocked out, but it seems that this custom is not a universal one. I did not notice any of them bestowing much attention upon their hair, of which some possess a profuse growth. Ochre they use freely (and probably also other colors at times) upon their body, and also paint most of their weapons and implements with it.

Venereal diseases have been introduced among them during late years, more especially since the discovery of gold on the Murchison.

NOTES ABOUT THE TRIBES INHABITING THE COSTAL DISTRICT FROM GERALDTON TO ALBANY, AND THOSE OF TERRITORIES NEAREST ADJOINING THEM. Information received from Mr. C. A. Paterson, of Perth :—

Formerly the native population of these districts were very considerable, but through an epidemic of measles that made its appearance among them about 26 years ago, it was reduced to about half its number, which has steadily diminished since. The exact number of the population of these tribes could not easily be ascertained, but scarcely one-tenth of those existing thirty years ago now survive. Diseases and vices not known to them prior to their contact with the whites have told heavily upon them, and seems to enervate them with increasing rapidity ; perhaps in another thirty years these aborigines will have disappeared entirely.

None of these tribes either circumcise or practice subincision, and in this respect they differ entirely from the tribes living further inland, but otherwise their customs, habits, and ceremonies are very similar. They also do not knock any of their teeth out, but they pierce their noses and tattoo their bodies with scars both in front and at the back. The painting of the body, particularly for corrobories, is greatly in vogue among them, and they also adorn themselves for these dances in various ways, by putting feathers and fancy articles made of sticks in their hair. Cannibalism has never been practised by them as far as is known.

They believe in, and possess a pronounced reverence for an Almighty being, whom they call Mamma guārra, the father of all. An evil spirit or terrifying agent they fear in Jinki.

The names of the tribes are those of their habitats, that is to

say, they name themselves as coming from this or that ground; but all have personal names.

The tattoo scars are produced by incisions made with the sharp edge of a stone. Emu feathers are placed in the wounds, and the flesh allowed to grow over them. When these become very painful and gathers, as is often the case, a medicine man is called into requisition to suck the feathers out. In this he generally succeeds, and is then called very clever. In fact, Bal Bolyera Kabulyera (He medicine man very clever) is a standing phrase to encourage the suffering, when in such cases, the sucking of the diseased part, or some professed charm, produces the cure.

Formerly the natives used to go to a great deal of trouble to build extensive weirs to catch fish near Peil's Inlet. Here the Murray and Serpentine join; the first, coming from a northerly direction, is a confined watercourse, but the Serpentine, coming from south-west, passes through a number of swamps and lake-like expansions. Particularly in the Serpentine they used to build these weirs, called Mungo by them, where the water narrowed again after passing through the expansions. These Mungos were very carefully constructed of long fine sticks of spearwood (a kind of titree) laid at the bottom as smooth as a carpet, and ending in narrow openings. Near these the blacks would watch, catching the fish as they were coming over the smooth sticks, and nick them at the back of the head with their teeth before flinging them on to the land. Or a net would be set at the end below the narrows. Sometimes very large catches were made this way, particularly at the beginning of the winter, when, with the increased rains, the fish returned from the spawning places up stream. At this time the blacks would watch day and night for the fish to come, relieving each other.

In the season when the fish were plentiful the natives from all districts used to come to these places and have great feasts and corroborees, and at the same time exchange weapons and implements; those from more inland bringing Kailis (boomerangs) to exchange for the spears of the coast tribes, the woods of the various districts being respectively more suitable for these weapons.

At these meetings the "Babin" ceremony, which is "making friends," was often gone through. The man who wished to make friends with the entertaining tribe would enter the assemblage quietly and seat himself across the thighs of the oldest man, who was probably the most influential among them, or a kind of chief, clasping his hands together round the loins, and touch the belly with his. Near the friend-seeker his wives, and perhaps sons, may be seated, and some others may be sitting round, but all appear unconcerned in the proceedings. Such apparent indiffer-

ence is one of the traits of a black's character. After a little while the following song is chanted, in which all assembled join :—

Bibba (breast) win wino (?)
Gnalyora (anus) win wino,
Yiri (semen),
Binnana (?),
Gumbulba (urine).
Gnara (?) yaul yauilo (?),
Gumbu (urine) yaul yauilo,
Matta (leg) ward wardu (?),
Yinna (foot) ward wardu,
Urr ! ! Urr ! ! Urr ! !

The finish of this song is an emphatic grunt-like exclamation, which is generally the finish of most of the songs in use at all their corroborees. The translation of the words that are queried could not be obtained by Mr. Paterson, although he tried several times to do so. The meaning of the song is, however, not difficult to understand ; all the parts mentioned have become one in both as a pledge of friendship.

In many of their songs words are made more expressive and phonetic by affixes or abbreviations. In this instance, Gum bulba for Gumbu.

WILD-MAN CORROBOREE.

The preparation for this remarkable corroboree often requires a whole fortnight, and is done in the most secret manner. None of the old men or any of the women are supposed to see those engaged in the preparation during this time, and should a woman accidentally or designedly come amongst them, she is ravished by all the men in the most unmerciful manner. The get up for this corroboree consists of a complete enclosure of the body in small branches and twigs, so that not a single portion of any of the limbs remains visible, and even their form is hidden. To accomplish this the blackfellows use a large quantity of chuat (string made of human or opossum hair), which is wound round the head and body in all directions, behind which the twigs are pushed, and carefully arranged, so that the string is completely concealed.

Like every other masquerade, these corroborees aim at giving surprise, and exciting admiration, and as the blacks are very vain, and ambitious not to be outdone, they bestow the greatest care upon these decorations, that they may be spoken of for a long time. The dance and show last only from ten to fifteen minutes, and then the covering comes down, that has taken probably as many days of mysterious preparation, and is entirely discarded.

PUNISHMENT FOR ADULTERY.

Although sexual connection is freely indulged in when permitted by the owner of the woman, clandestine intercourse is

punished with death, but sometimes another painful punishment is inflicted. This is as follows :—

The man accused of adultery or elopement is brought to the camp, and condemned to be gidjied. He sits silently on the ground, with his legs stretched out in front of him, whilst his offence is being discussed by the offended and the old men. When the decision has been arrived at, the offended man takes a spear, and drives this through the culprit's thigh, and pins it to the ground. This is to signify that he has been served the same way as he has offended; inasmuch as he has pierced the offended man's flesh (that of his woman, which is his property), so his flesh is pierced.

LANGUAGE.

The language of all the coastal blacks is very expressive and descriptive, although as a whole very simple. In many ways the words are modulated by affixes and prefixes, and abbreviations are in common use. Many of the names of animals, particularly of birds, are adapted from the natural sounds these produce. (These remarks may be justly applied in a greater or lesser degree to all the dialects of the Australian races.)

Notes referring to the Kimberley Natives. Supplied by Mr. W. Paterson :—

"The natives of this district eat a certain kind of fruit that ripens about Christmas, swallowing the stone it contains with it, and repeatedly resorting to the same spot, deposit their voidings, generally close to their camping-place. When returning after some time to the locality they pick the stones from out of the excrement, and after cracking them eat the kernel.*

"All circumcise and slit the urethra, which operations are generally performed at the age of 16 or 17. I never saw any that were not slit completely down.†

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* During our trip great numbers of Quandong stones (*Santalum acuminatum*), either dispersed or in small patches, were frequently observed in the neighbourhood of waterholes. At first it was generally believed that these were brought there by the natives, who, it was supposed, had eaten the flesh of the fruit and discarded the stones. But later on I discovered that they were voided by emus, which habitually visit the waters, and no doubt during droughts often come from great distances. The kernels of these nuts are edible, and may probably be eaten by the natives when found in this rather objectionable state during times of severity. May not the kernels which Mr. Paterson speaks about have been voided by emus instead of by men?

† Evidently the terrible rite does not prevent impregnation, although it must help to avoid it. The statement that all have to submit to it corresponds with that of Billy Weaver (*vide* supra), and also with my own observation. The assertion made by some writers that certain individuals are left exempt from it for the purpose of propagating the race must, therefore, be relegated to the domain of the fabulous.

"They knock both front teeth out, and mark their body with tattoo scars.

"The dead are buried in trees, and later on the marrow is abstracted from the bones and eaten. The men eat that of their wives, or *vice versa*, the women that of their husbands, according to who may die first; but at any rate, it seems to be that the privilege of eating the marrow is left to the nearest relations.

"The mothers carry their dead children about with them for some time after death, having wrapped them in a sheath of bark from the paper-bark tree. The flesh soon dries in this way. The corpse is also frequently hung in a tree with this covering about it, and later on the bones are cracked and the marrow eaten. (Whether the marrow was simply considered good food, or whether there was a superstition attached to this gruesome practice, my informant could not state.)

"To protect themselves against the aggressions of the swarms of mosquitoes that appear in many places during the whole of the year the natives construct an oven-shaped sleeping place of clay. To form the dome they pile a heap of bushes together, which they cover with mud just thick enough to stand by itself, and when dry, pull the bushes out of the hole left for the purpose of entering the structure. This opening is just large enough to allow a man to squeeze in, and is closed by a tussock of spinifex pulled into it from outside, so that it jams in tight. Such almost airtight dormitory is often occupied by the whole family during the night, when the heat must become terribly stifling, only to be endured by blacks.

"Paene omnes Kimberleiani Septemtrionalesque pueros habent quibuscum stupra faciunt. Pueri ad libidinem incitati penem in incisuras eorum ponunt. Qua licentia multo magis quam voluptate sexuali se frui illi affirmant.

Extracts from My Diary.

4th June, 1891 (Near Everard Range).—Towards night a blackfellow came to our camp. He made a fire a little distance away when he was signalled to sit down. For this purpose he had brought his piece of lighted bark. On our approach he gave us to understand that he had killed a kangaroo, showing us where it had scratched him on the arm. He was quite naked and of fine physique, with plenty of tattoo scars about the upper arms and chest. We gave him something to eat and some tea, but he did not eat much, being evidently too full of kangaroo. After receiving some presents and clothes he departed, but from his signs it appears that he will come back and bring some more blacks with him.

5th June.—The black returned this morning accompanied by a

younger one, who is either his son or younger brother. We endeavoured to get information out of them, but failed to do so on account of want of knowledge of their language. The younger fellow left again during the afternoon.

6th June.—I gave the blackfellow a piece of a mirror, which caused great fun. He had evidently not seen anything like it before, and looked into it very sedately and with surprise, viewing himself from different sides, and ultimately looked at the back of it, like a monkey would do.

7th June.—Three more blacks made their appearance at the camp this morning, who, as well as our former friend, followed us all day, and now camp near by. The three newcomers are young fellows of fine physique, and probably from 18 to 20 years old. Two of these, like the old one, had the right front incisor knocked out. They are all circumcised and have tattoo scars on breast and back. One of them has fresh scars on his chest, which are not yet quite healed up. A dingo came near the camp and was nearly shot by Mr. Streich, but one of the young blacks pointed his finger to his chest, said "puringa" and looked rather excited; this was acknowledged, and saved the animal's life. The dingo allows himself to be handled quite freely by the blacks, but will not allow the whites to come near him. During the day we met a number of native camps.

8th June.—The blacks had gathered some native tobacco plants which they call "okiri." They use it for chewing or rather sucking, placing it on the lower lip after preparation, which is as follows:—They rake the cinders of the fire aside, and spread the green leaves on the heated sand until they are nearly dry; after that, the leaves are rolled into little balls, which they knead with the teeth, the spittle sticking the leaves together. When thus made up and rolled between the hands into a cylindrical roll of nearly the size of a thumb, they are dried again, and kept for use. Nearly the whole day long I noticed the blacks carrying a roll on the lower lip, which during meals was placed behind the ear. The juice of the tobacco stains their lips and corners of the mouth, but this is easily removed. On our way one of the young blacks dug out one of the banded ant-eaters (*Myrmecobius fasciatus*) with his yam-stick and "Wera," in a remarkably short space of time, although it necessitated the removal of nearly a square yard of sand before the end of the burrow was reached. They also occasionally dug at the roots of some Mulga trees, and extracted from them the larva of some Cossid moth, which they called "mako." This is eaten alive and much relished. . . Number of enclosures of old bush fences, formerly used by the natives for trapping game, were met with during the day in several places. The blacks keep a fire on each

side of them when lying down to sleep. It made quite a picturesque sight when the four blacks after dark went in search of firewood, each with a burning faggot of grass in his hand, moving backward and forward amongst the bushes.

9th June.—Seeing the blacks digging away at some roots I stopped and watched their proceedings. They were after some ants and worked away with their yam-stick at the root of a small decayed Mulga, that showed the grooves of the insect. After loosening the soil with the yam-stick, they removed it with the "wera" that acts like a scoop. The pregnant female they were looking for was nearly at the bottom of the tap root, a few feet below the surface. She has a cyst of nearly half-an-inch in diameter on the abdomen, which is filled with a semitransparent yellowish fluid; it is called "mamma ilka" by them, and much enjoyed when sucked. . . . There is a rock-shelter near the camp that is probably often frequented by blacks as the paintings on the rock and the ashes and charcoal-remains of recent fires seem to prove. At the base of the small granite range, about two and a-half miles from the soak, are two native wells close to one another, filled with fine clear water. On the flat faces of the diorite dyke at the top of the range several very regularly shaped circles were found scratched into the rocks.

13*th June.*—Billy (the first black who came to us near the Everard Range and followed us ever since) had tracked an emu and came in with three eggs. We had one of the two he gave us for supper between the two of us, but Billy ate his, which was a very large one, after an *entré* of an iguana about 18 inches long, followed by an opossum for second course. All these victuals were cooked in the hot sand and tasted delicious, which no doubt induced Billy to cook a second iguana at once and another opossum afterwards. An emu egg, two iguanas and two opossums, besides some tea and bread, I think is a fair record of a black's appetite. We had only a little of one of the iguanas each to try it, and a leg of one of the opossums, and I must confess that the blacks' way of cooking is the most excellent method of retaining the flavour and juice. The opossums were plucked like a bird, which is the general way of removing the fur of the game, and then baked in their skin after the entrails had been removed through a small incision that was afterwards stopped up with grass. The iguanas were cooked without any preparation. After cooking, the skin peels off easily and the flesh looks delicately white, juicy, smoking and savoury.

15*th June.*—The rocks we had seen to the east proved to be a sandstone ridge running nearly north and south, with an escarpment looking west. Here in a low rock-shelter some native drawings were found, but on the face of an escarpment running

parallel with the most easterly one, and about a chain and a-half further to the east of it, I discovered a fine series of rock paintings. I copied them carefully, as they are the best met with so far. In front of the painted escarpment the ground is flat, with a very moderate rise in a northerly direction, extending thence for about five hundred yards, where it meets an almost vertical face of rock some twenty feet high. From here the ridge bifurcated through a fault in the formation, and in this way these parallel escarpments near the southern end of the ridge had been formed. The protected area thus formed makes an admirable camping ground. There was a rock-hole containing water at the the southernmost end of the western branch of the ridge opposite the rock paintings. This hole has evidently often been visited by aborigines for the purpose of grinding food or making implements, because a number of depressions were seen round it in the fine but hard sandstone, which were no doubt caused by friction of the hand.

16*th June.*—Reached the salt lake, which Billy called "punndee." In several places over the surface of this dry lake, holes had been dug by natives, evidently for the purpose of obtaining gypsum, of which a layer of large and small crystallised pieces was found a few inches below the surface.

18*th June.*—Some blackfellows' camps lately occupied were seen close to the hill.

21*st June.*—I went to the hill two miles north of the camp. This is an almost solid mass of granite with rocks scattered about it, and occasionally eroded layers, that have formed rock-shelters. In one of these I found a recently extinguished fire, proving its recent occupation by a native.

22*nd June.*—We saw several newly made traps for game as we rode round some of the granite hills. These traps consist of a hole in the ground cut down about five feet perpendicularly and fifteen inches by two feet six inches wide. They are sufficiently covered by brushwood to hide the excavation. From each side of this a slightly curved brushwood fence extends to about thirty or forty feet, so that an almost right angle is formed at the hole. In front of the hole a stone about ten inches long and three to four inches thick is placed, and from point to point of the brush fences are laid a couple of pieces of wood. The stone seems so placed either to divert the attention of the game away from the hole, or to induce them to hop over it and plunge into the trap, whilst the wood laid across the fences will prevent their jumping sideways at that point when driven to it. Very likely these traps are self-acting and used by driving the game into them; in any case the animals would keep along the fences and be sure to get caught in a hole at the apex. Several old wurlies and fences had

been met with before, and at a rock-shelter near a waterhole I saw some rock paintings, which I sketched. They are simple, but show a great freedom of hand ; particularly some rings inside each other made with red ochre, which are very accurately executed. These indications lead to the conjecture that the place is frequently visited by natives.

23*rd June*.—Soon after daybreak a blackfellow approached the camp, announcing himself by lighting some spinifex tussocks as he was coming along. He is an old man and very timid, and like the other blacks, had the right central incisor knocked out, was circumcised and had many tattoo scars on his chest. . . . Our blackfellow did not follow us from camp. Evidently he did not wish to cross the boundary of his country. He said "whitefellow ! whitefellow !," pointing towards the west, and seemed frightened. He meant to say that there were blackfellows over there, for it dawned upon us that he had confounded the terms, and called us blackfellows and himself whitefellow.

25*th June* (Camp 9).—The doctor brought the copy of a painting of a wheel, and was of opinion that some large limbs that had recently been cut from a gum tree and some pieces of bark for water vessels had been cut with an iron tomahawk. If this supposition is correct, the blacks must at some time or other have been in contact with white men, or found the cutting tool, whatever it may be, at some former explorer's camp and brought it a long distance.

26*th June* (Camp 12).—Soon after breakfast six blacks came to our camp ; three of them young fellows who evidently had only recently undergone the ceremony of circumcision. One of them, a very young man, was particularly short but of firmly knit physique. The older ones had their right central incisors knocked out, but not so the young ones. It seems, therefore, that this ceremony is only performed at a later age (perhaps when they are about to get a wife ?). They all had scars about the chest and most of them about the arms also. The doctor photographed them in a group, also measured and examined them. He tells me that all have the urethra slit, like those of the Everard Range tribe. They seem to belong to a different tribe and are not of such good physique as those met before, but fairly proportionately built. Their language may be probably also different, but they understood and use the word "papi," and other words in use by the Everard Range tribe.

1*st July* (Camp 13).—I found a small rockhole with water in a very secluded place and not easy to approach. The blacks had marked the place about a chain below it by some white circles, one of which was exactly like the well-known "Plimsol Mark" on ships, only that the central bar was vertical.

3rd July (Camp 14).—Messrs. Lindsay and Streich returned to camp just after tea time and brought a blackfellow with them. They had met a number of them about seven or eight miles away, near a soakage ; they at first ran away at the approach of the camels, but afterwards made friends by twisting a piece of a "walputti" tail into Mr. Lindsay's beard and the tip of a cat's tail *(undoubtedly a feline)* into that of Mr. Streich's. They were very pleased when Mr. Streich gave them tobacco, handing some of it to the old men first, who, when he also offered some to the younger, tried to interfere and called them "jimba," just as if these were not entitled to such privilege. The one brought to camp has his right front tooth knocked out, is circumcised, and has scars on the chest and back. He calls water "kapi," and fire "waru," which means hot in the Everard Range dialect.

4th July (Camp 15).—We met nine blacks at this place, one of them having been among the six that came into Camp 12. They are not nearly such a well shaped lot as those about the Everard Range. One of them, a middle aged man, is quite a puny individual. Their beard is rather peculiar and not very strongly developed, thin on the cheeks and elongated from the chin. All are circumcised and have the uretha slit like those of the Everard Range tribe.

5th July.—Two more blacks came to the camp who looked much stronger than those already here before them ; one of these is particularly a well made fellow and in good condition. All the blacks have a tooth knocked out, but some of them the left central incisor. Those previously observed had always the right one knocked out. They also, like some of those met before, mat their hair together with a sort of wet clay, forming it into rounded clots that resemble those in a dirty cow tail. The most of them wear their hair tied together, forming it into a thick knob, and at times into a tail-like appendage up to 10 inches long. Some of the older had the front part of their hair on the top of the head cut short (probably by singeing) and red ochre rubbed over this part and the forehead. The most of them were painted to some extent, with red on their chests and had black bands on the forehead, and all had more or less tattoo scars on the chest, arm, and back.

6th July.—After tea we went over to the blacks' camp, and had some fun with them. They have a row of fires and lie between two of them during the night. A revolver-shot frightened them very much and made them crouch. Their mimicking and the facility with which they reproduce sounds is astonishing. We sang "God save the Queen" for them, to induce them to chime in, which they did at times. Our limbs were much admired by them, particularly the stout calves of some of us. Much merri-

ment was also created over the drawing of various tracks of birds and animals on the sand.

7th July (Camp 16).—There were ten or eleven blacks camping close to the hill when I returned. Only two of these had been at our previous camp. One young lad is neither yet circumcised, nor has he a front tooth knocked out, and is perhaps the most interesting figure amongst them. He is well-shaped, looks intelligent, and has altogether a pleasing face. I got a few names of things from them, but they soon intimated to me that they wished to sleep; I therefore left, after again wounding myself with a penknife for the purpose of obtaining the name for blood, in which I succeeded this time.

9th July (Camp 17)—The blacks had a little corroboree, singing a simple tune and clapping their hands in time to the hop; but they soon gave over, perhaps not feeling in too good a humour on account of their empty stomachs. I noticed that one had his beard bound together with a string and formed into a pointed queue.

14th July (Camp 21).—About six miles from camp we passed close to a low range and met with a number of natives who were evidently known by the two that followed us. They were of different age; one of them was getting grey, and the youngest just showed the beginning of a moustache. This one appeared to be of a light colour with very light hair, but on close examination I found the colours entirely due to a grey pigment (mud?) with which he had besmeared himself all over; the light brown colour of his hair was probably caused by the bleaching of it. All the others were painted with red ochre, and two had regular designs on the chest. A band two inches wide ran from each of the shoulders downward across the breast bone converging just above the pit of the stomach, and from this point the band ran straight down over the belly. The one had also a white band of nearly an inch wide along both sides of the red band that set the design off to advantage. They all wore their hair in different styles; some loose, some tied up in front and loose behind, and others had it tied up altogether, and with a roll of grass bent in in some cases. Everyone was circumcised, had one of their front teeth knocked out and the nose pierced; probably all had the urethra slit. . . At night the blacks amused themselves with a little corroboree, which attracted us over to them. After that they amused themselves and us by making all kinds of tracks on the sand, at which some are very smart. During this procedure four more blacks arrived, who yelled terribly when they came near the camp. This was evidently done to announce their friendly intentions, and those in camp promptly replied, and told us that the newcomers were "jimba." This word must, there-

fore, either mean friend or is the name of a friendly tribe or family. I could not get at the correct meaning of it.

20*th July* (Camp 27, Skirmish Hill).—The doctor and Mr. Lindsay yesterday met an old black and his wife, who were greatly excited at the sight of them and the camels. They seemed to belong to a different tribe, but knew the word "kapi." Besides several pieces of game in their possession they had collected a good deal of "Kurrajong" seed, which they had roasted for food. These roasted seeds have a very pleasant nut-like taste.

24*th July.*—Near the waterhole I noticed two skulls of dingoes and some bones, broken and whole, of the same animal, which prove that these animals were eaten by the blacks.

5*th August* (Camp 33, Barrow Range).—This afternoon nine natives came to the rockhole to have a drink and afterwards delivered a harangue from the rocks, which I translated to mean that they objected to our stopping there and drinking up all the water.

6*th August.*—Messrs. Lindsay and Streich went over to some rocks about half-a-mile to the north, where some natives had been seen and found six of them there. They would not give any information about water and behaved very excitedly, probably to protest against their supply of water and game being appropriated by us. A good number of rock-wallabies were found about the hills close to the camp, and flocks of parrots and pigeons came regularly mornings and evenings to the water. A great many depressions ground on to the flat rocks near it, and a number of grindstones, indicated that this place was a much frequented camping-place of the aborigines.

28*th August* (Camp 35, near Mount Squires).—During the forenoon eight blacks came near the camp, and after prolonged inducements they allowed themselves to be approached. They were, with one exception, all tall fellows and of good physique. One in particular, a young fellow, was well shaped and quite six feet high. The smallest was about five feet four inches, and the others between five feet seven to five feet eight inches. All of them had their faces more or lest painted with white pipeclay, in some instances having rubbed it all over. The markings on the chest and belly, made with the same stuff, were in some cases of a symmetrical design that set their figures off to advantage.

29*th August.*—The blacks came back this forenoon and received a large parcel of salt meat. There were ten of them this time, but they were still very shy and made off with the meat almost as soon as they had taken possession of it. However, they expressed their satisfaction with the present received, after they had retired about a hundred to a hundred and fifty yards. They lifted both their hands above their heads and stretching

their legs, with the feet over a yard apart, jumped three or four times to the right and then the same number of times in the opposite direction, jumping in unison and with each jump giving a shout of joy that sounded like "hau." This they repeated three times, at intervals of a few minutes, whilst retiring, but each time turning round to face us ; the tallest of them holding the bag with the meat outstretched over the head at full arms' length. All had one of the central incisors knocked out, were circumcised, and had tattoo scars on chest, back, or arms. Whether they were otherwise mutilated I could not ascertain, because they would hardly allow themselves to be touched. I did not notice the yellow stain on the lips and mouth caused by the use of tobacco, and it may, therefore, not be known to them, although the conditions about the soakages seem to be favorable for a luxuriant growth of the plant.

3rd September (Camp 40, Victoria Desert).—We came to camp at about 2 p.m., having just before caught a little native girl of about five to six years of age. She screamed terribly when she saw us approach. The poor little thing trembled in all her limbs, when we got hold of her, and she handed us immediately the large lizard she had in her hand. When the caravan came up she received some water, of which she drank greedily, became pacified after that, and ate some of the sugar given to her. Later she got some jam, and at times was incited to a smile, but she submitted more passively than otherwise to our treatment of her. Everyone tried to be kind to her, and I got one of my little mirrors out, but the reflection of her face (which with adult individuals who have never seen this phenomenon before is generally an amusing study to the observer) had no effect upon her—at least she did not display any surprise. She was, however, much interested in the regular impression from the nails of a new pair of boots one of our party was wearing. Apparently, the almost instinctive intuition of tracking was already highly developed in her, and tracks so foreign to her previous observations excited her interest. She understood the word "kapi," and pointed in a certain direction, and later in the afternoon took Messrs. Lindsay and Wells straight to a rockhole about three miles away. On returning from this water they met seven blacks, who appeared to have threatened them at first, but who, after the child was restored and received with a good deal of demonstration on their part, were quite friendly, and accepted presents from our party. I was informed that they came out of the mulga scrub only in pairs at a time, which seems to prove them to have been frightened rather than aggressive.

4th September.—Before breaking up camp this forenoon we went over to the water pointed out by the little girl yesterday.

It is found in a cavity on a sandstone ridge overlain by conglomerate. About 30 bucketfuls of muddy water were obtained, but a good deal of sand had to be removed for the purpose of raising that much, and at last the drainage ceased. At the southern end of the ridge, numbers of caves occur in the escarpment of the rock, which have frequently given shelter to the natives, who left some traces behind in the shape of extinct fires, bones, &c. There were, however, no paintings in these caves.

7th September (Camp 44, Victoria Desert).—About 9 o'clock a.m. we came to the waterhole found by Mr. Wells on his flying trip. There are, in fact, three waterholes in a stratum of conglomerate, two of which still contained some water, but not nearly 300 gallons as reported. It took a great deal of trouble to obtain 30 bucketsful, which only makes about 90 gallons. Either of these holes, if quite full, would scarcely hold more than 400 gallons, but when found they were half full of debris and sticks. There were eleven blacks, some of them women and children, at the hole, whom we surprised, as they had not heard the approach of the soft tread of the camels. As soon, however, as they perceived us they all ran away, screaming dreadfully, particularly the young ones, who could not follow fast enough to keep up with the men. It took a great deal of coaxing to induce the men to return. When they ultimately did so, they came very cautiously and brought two tins, which they had evidently found in Well's former camp close by. It seemed as if they were afraid of being punished for taking them. All got a present of a bright-colored handkerchief, but this did not allay their timidity sufficiently to enable us to obtain any information from them. They understood the word "kapi," were circumcised, had a tooth knocked out, and had more or less scars on the chest or arm and some had them also on the back. Nearly all were more or less painted with ochre and some had symmetrical designs on the front of the body made with pipe-clay. One of them was a cripple, having lost half the right foot, which was twisted, the heel being in front. On the left foot also some toes were wanting and besides that his left eye was gone completely. However, he could run very well in spite of his defective feet. The others were of good physique, but rather thin, not to say emaciated. Their height varied considerably; I would say from 5 feet 2 inches to nearly 6 feet. One of them (the tallest) was a fine built young fellow, who, from the design on his chest and the number of pieces of dingo tails, twisted in his hair, that were drooping over the back of his neck, had the appearance of being a chief or a leading person in the tribe. One individual had a number of twists made of a light-colored fur, about $2\frac{1}{2}$ inches long, attached to the hair of the genitals, that hung down like a

fringe. Their weapons consisted of spears and merus, the same as those previously seen, but the stone at the end of the latter seemed to be inferior (not made of flint, chalcedony, or chert), and the short, carved stick was also similar to those seen previously. A number of large water-bowls were left by them near the waterholes; some of these were made of the thick bark of the Desert-gum, taken from the bent part of a tree, so that they were naturally shaped, the others were carved out of wood. There was also a circular pad left behind made of twisted fur string, that is evidently used for carrying these water-bowls on top of the head. Similarly shaped pads made of coarse grass I had noticed near Camp 33. These were seemingly only made for temporary use, and discarded afterwards.

3rd October, 1891 (Fraser Range).—There were a number of natives of both sexes near the station, some of the women with small children at their breasts, which the doctor photographed. The race here is a very poor and miserable representation of the human stock, owing no doubt mainly to the scanty food supply in this barren country. The average height of the adults is scarcely more than 5 ft. 3 in. to 5 ft. 4 in. and their whole appearance terribly starvation-stricken. Their limbs are almost fleshless and some of the women's thighs not thicker than a man's arm. The men are all circumcised and according to information all subincised, but they have none of the front teeth knocked out. They wear their hair either loose or tied up in a manner somewhat similar to the other tribes previously met with. The women carry the children, when they are strong enough to hold on, in a peculiar fashion, by resting them straddle-leg on the hip with one arm round their body. The child has to hold on with its legs and loops one arm through that of its mother. One of the women carried a child on a piece of Eucalyptus-bark, the edges of which were curled up through drying. When the children are born they are rolled in ashes to dry them, and are then put into such a bark cradle, in which they are carried until they are sufficiently strong to be placed on the hip as just described. The suckling of the children seems to be continued for several years; one youngster I saw, who could already run very well, that stood in front of his sitting mother whilst sucking. A man who was scarcely more than 26 years old had a wife that seemed more than 60; she looked fully that age, and was the ugliest old hag I ever set eyes upon. What a marked difference a regular supply of food makes upon their appearance was strikingly demonstrated by the couple who live constantly at the station. They were in good condition, and their skin looked clean and glossy in contrast with that of the others, which was scabby or rough, and quite dull in appearance. The keeper at the station informed

me that the natives of that district rely to some extent for their flesh food supply upon domesticated cats, which are plentifully found there in a feral state. (These must have come originally from the inhabited parts of Western Australia, and consequently have spread several hundred miles, having probably followed the small lizards and birds they live upon.) Other flesh food of the natives consists mainly of lizards and ant-eggs (pupæ), as these are found almost everywhere; grass and other seeds form the principal vegetable food. Kangaroos are very scarce, and other marsupials almost absent; emus are also very scarce.

5th October, 1891.—The morning was very windy, and the afternoon boisterous; a smart shower of rain fell. The two blacks fixed up a wurley, and towards evening the woman belonging to the one with the very flat nose arrived with a boy about five years old. The youngster looks fairly well fed, but has a very dilated stomach, which spoils his otherwise fine shape. The woman, however, has a most wretched appearance, although not badly shaped as far as legs and arms are concerned and taller than any of the others I have seen near the station. She is decidedly badly fed, showing the bones plainly through the skin, particularly about the ribs; she has no flesh, and between the clavicle and shoulder-bone a deep hollow is visible. Her distended abdomen, much wrinkled as the result of child-bearing, is covered with some flesh-red streaks, previously seen on several natives, which seems to be a skin disease—(I have since been told that these red marks are the result of burns from the lighted bark they always carry)—and which extend up to the breasts that hang down flabbily and much wrinkled. Her face is also already getting wrinkled, although she is scarcely more than 25 years old; whilst her eyes are bleared by the smoke of the camp fires. How the natives retain the keenness of sight they are undoubtedly possessed of is a wonder to me, considering that they constantly indulge in sitting between smoke fires when in camp. There was scarcely one of them I met whose eyes were not running, and the moisture which trickles down their cheeks is never wiped away, no discomfort evidently being felt. This tribe is certainly the most abject of all the natives of Australia I have ever seen, even more wretched in appearance than the remnants of the Yarra Yarra tribe that could still be seen 25 years ago in the neighborhood of Melbourne. The one with the flat nose accompanied the black who was sent from the station to lead us to this rockhole. His nose is the flattest imaginable; it dilates just above the lip to nearly an inch and a half and looks almost as if it had no bone in it, but the septum is pierced to receive a "kondel." He is a native of Hampton Plain, has the right central incisor knocked out (the natives of the Fraser Range do

not knock the teeth out, as already stated), is circumcised, and subincised.

7th October.—When I got up this morning I found the native woman on her knees engaged in pounding some mallee roots. These were perfectly dry and were lying on the hollow side of a thick piece of bark that served as a base for the operations of pounding. I could not help admiring the dexterity with which this was performed. Taking a handful of short pieces, she pressed them firmly down on the bark, leaving an opening between the thumb and index finger of perhaps an inch and a half in diameter. Catching the yam-stick with the other hand about four inches from its sharpened end, she brought it vigorously down upon the open space of uncovered bark. The accurate hitting of the small exposed surface with a heavy stick that is over four feet long and an inch thick, caught so much below the centre of balance, must have required a considerable amount of practise to acquire, as she never missed her aim, which is the more surprising, because the yam-stick was not brought down vertically, but almost at an angle of 45°. Any European trying to do this would cut his hand nine times out of every ten strokes he would make. When the roots were pounded almost to dust they were eaten dry, and the men who had not stirred or helped in the least towards preparing this unique repast satisfied themselves first, leaving the coarsest and most fibrous stuff for the women. The taste of it is slightly sweetish, which seems to indicate that it contains a saccharine substance; but the nutriment it furnishes as a whole cannot be very great. The finest of the dust is the sweetest, and undoubtedly contains the greatest amount of sugar particles which may have crystallised during the preparation of the bark.

11*th October*, 1891.—The blacks were busy this morning making message-sticks, for which they used some kind of acacia-wood they call "yauwilli." The wood is worked down with the stone chisel fastened on the end of the spear-thrower and afterwards scraped smooth with the sharp edge of a chip of flint. For this purpose they, however, had already discovered the usefulness of glass, and employed it also. The lines were put on with embers. A piece of hard stick is chosen that will form a well-tapered conical ember on one end. This is fairly firm to stand a gentle pressure, and lasts for some time. Whilst the spiral or wavy lines are put on the ember is kept aglow by gentle blowing. I have no doubt that certain meanings are conveyed by these differently curved, wavy, and spiral lines that may be broken off or interrupted by a circle or bar, but through ignorance of their language I could not understand the meaning of the explanations given by the blacks.

17th *October*.—Two blacks came to our camp this morning, who seemed to be well known to those staying with us, and were well received by them; the boy particularly displayed great delight. The man possesses a marked Jewish countenance, and the female is rather smarter than the general run of them. She has a number of the red marks on the stomach, which they say are caused by fire through carrying the lighted bark close to the body during windy days. The male has the right central incisor knocked out, is circumcised, and has the urethra completely slit open. During the afternoon two more blacks made their appearance at the rockhole and afterwards came over to the camp. They must have travelled a long distance, as they were very thirsty and drank an enormous quantity of water at the rockhole, and more later on at the camp. The older, a smart and intelligent-looking fellow of about 25, had his head decorated with a semicircle of magpie tail feathers, and wore a peg through his nose. The younger is still a lad and not yet circumcised, although he is getting a moustache. He has an extraordinary large mouth even for a blackfellow and remarkably thick lips. Both have their full set of teeth and wear their hair tied back in the peculiar chignon-like knob previously noted. They come from the south-west, and seem to belong to a different tribe to those who have the teeth knocked out and who come from Hampton Plains, but are evidently on friendly terms with them and speak the same language.

19*th October*.—The blacks caught a number of lizards for me, which are abundant here, but so difficult to catch on account of their swiftness. The method of catching them is ingenious. One of the blacks made a small fan of feathers, about four inches long and wide, which he fastened to a switch, and tied this to two more lengths, so that it resembled a fishing rod with the fan on the end. When one of the lizards was running by, the fan was agitated in front of it a few feet above the ground, by which the attention of the lizard was attracted and when its eyes were rivetted upon the quivering feathers, the other black speared it with the point of his yam-stick, often cutting its head off. The accuracy of the aim was surprising, for I rarely saw them miss, although the lizards are only about half an inch wide. Even through a dense bush I have seen them pierce the little reptiles, which is still more surprising, considering how easily the branches may divert the point of the stick from its aim. The women brought in some bark of roots, which seemed to me as if it had been lying in water for some time. It looked damp and had the appearance of partial disintegration, as if the fibrous substance was parting. Probably it is put in water to loosen the outer brown and earthy covering. They chewed some of it

during the preparation, sucking the sweetish substance after mastication and spitting the fibrous matter out in the shape of a ball. The preparation requires a considerable amount of labor. The pieces of bark are first broken in lengths of about six to eight inches and split in strips of about half an inch wide. These pieces are then laid on hot ashes, well pounded with the yam-stick, and constantly turned and mixed with the ashes. By this means the outer brown bark is removed, whilst the heat makes it crisp, but the inner white bark remains intact on account of the greater quantity of moisture it contains. When this process is completed the white strips are dried perfectly before the fire and afterwards triturated in the manner I have described before. Only the finest of the pounded stuff is eaten, the coarse and fibrous portion being rejected.

20*th October*, 1891.—I amused myself this evening for some time with the blacks, who were throwing sticks at a small iron hoop rapidly rolled along the ground. This was good practice for them to throw at running game, and amusing exercise for me, whilst my occasional misses afforded great delight to the natives.

30*th October*, 1891 (At the Damsinkers' Camp near the Fraser Range).—I was well received at the camp, found the men engaged at work, and just about finishing one of the dams. A great number of blacks, men and women, were hard at work carrying soil out of the excavation. They had to work in pairs, as they carried the earth on litters made of sacks with a couple of saplings run through them. For this they received a good supply of mutton three times a day. Most of them are of rather small stature, not measuring more than 5 feet 3 inches on an average, and the women less than that. Six or eight old ones of the fair sex are particularly scraggy individuals and extremely ugly. There were, however, a few young men above the average and well shaped, particularly one of them, who was about 5 feet 9 inches high, and the best-made man seen hitherto. Several of the men had deformed limbs caused by burns when young. One of them had half the right buttock and some flesh from his side burned away, and in consequence walked lopsided. A child just able to walk had both its hands burned not long since, and looked a wretched object with all the fingers on one hand distorted and contracted, and the greater part on the other also. Here I also saw a woman with six perfect fingers on each hand and the same number of toes on her feet. Not only are the fingers perfectly formed, but there are the corresponding number of metacarpal bones in the hand. I learn that she has several brothers and other relations with the same remarkable development, but none of them were at the camp during my visit.

31*st October* (Damsinkers' Camp, F.R.).—During the forenoon I obtained a number of names from the natives. One of them Wainbret by name, who belongs to the coastal natives, assisted me greatly, having the advantage of speaking English fairly well, and being also rather intelligent. The coastal tribe, he tells me, claims about 30 to 35 miles inland, and was at one time very numerous. They neither circumcise, slit the urethra, nor knock out their front teeth. He tells me that all the "Bardeks" (*i.e.*, those that circumcise and perform Sturt's rite) are cannibals when pushed for food. He also made the assertion that the want of teeth was a sign that the man had partaken of human flesh. This may be erroneous, because the coastal tribe somewhat despise the Bardeks, although not now in open feud with them, and even friendly. With the exception, however, of this information, I believe everything obtained from Wainbret to be thoroughly reliable. He readily acknowledged his ignorance if questioned about things he did not know. Another native called "Paddy" also spoke English fairly well. He is a Bardek and comes from the east of Fraser Range tribe. Some of the names he gave me of plants I showed him differ from those of the Fraser Range tribe, and the natives of Hampton Plains have also different names in some cases. The language of the different tribes belonging to the Bardeks seems to me essentially the same, the leading terms and expressions being identical. The language of the coastal tribe, however, seems to differ considerably from it. I regret that I could not make more extensive studies on this subject and did not come a few weeks sooner to this camp, where a favorable opportunity was offered for such a purpose by the congregation of individuals from several tribes. I obtained some etchings on bark made by the natives, representing some crudely-drawn landscapes and other objects. They are produced on the inner side of the bark, when it is still fresh, by a pointed piece of hard wood, and are called "worma." A few remarkable facial types were seen amongst the natives congregated here. There was the one with the very Jewish face already spoken of, who was very delighted torenew his acquaintance with me. He is always happy, revels in little pranks, and is particularly proud of his youngster by wife number two ; which, however, I am dubious of being his own on account of his extreme mutilation. Another remarkable type is one that looks exactly like an African negro, both as regards features as well as hair, which latter is extremely short and curly, and almost woolly. A third was called "Frenchman," owing to his resemblance to one. The hole in his nose for the "kondel" had been torn, and in consequence this organ had a peculiar sharp point. His dress, however, contributed greatly towards his French appearanee. It consisted of blue trousers, and shirt of

the same color, and a red handkerchief for a head cover. These were the remnants of the garments supplied by the Government at Rottnest Island, whence he had just returned, after being transported for twelve months for sheepstealing. During the sunny hours of the forenoon (it was Sunday, and work was suspended) many were engaged freeing each other of the vermin on their heads. The larger of these are not despised as a dainty morsel.

3rd November, 1891.—The blackfellow perceived a small hole in the fork of a large mallee-tree, and from the ants crawling in and out in a continuous string concluded that water had accumulated in the hollow lower down. He quickly broke a twig of a quandong-tree, and loosened the bark of it between his teeth, after which he easily stripped it off, thus forming a tube about a foot long. By inserting it into the hole, he managed to get a drink by suction, and his wife likewise.

9th November, 1891, near Hunt's Well. — The black, his woman and the boy left us to-day, going towards some smoke, where, no doubt, they expected to find some of their tribe; they however returned, bringing an old man with them. This individual has a front tooth knocked out, is circumcised, and has his urethra completely slit open. He wears his hair tied in a knot, and both his shoulders are well marked with tatoo scars.

10*th November*, 1891.—The old man accompanied us to-day, but the other blacks stayed behind. After dinner, I took him in the bush, for the purpose of sending him up some trees I had seen in flower, but I could not induce him to climb them, and when I wanted him to come back to camp, he urged me to come in the opposite direction, saying "kapi! kapi!" and as I thought he might really know of some water not far away, I followed him. After travelling over a mile, the black increased his pace considerably, stopping occasionally when I did not follow quick enough, and saying "kapi! kapi!," pointing in the direction he was going. However, after another half-a mile more of this game, he ran away and disappeared in the bush. I had been hoaxed by a blackfellow!

The Language.

In dealing with the very important subject of the language and dialects of the tribes encountered on the journey, I much regret that no chance was afforded me of obtaining a sufficient knowledge to acquire something of their structure. The time of their stay in every case when natives accompanied us was as a rule of such short duration that not much more than a limited vocabulary could be obtained from them.

What I have been able to procure is herewith presented in its

fragmentary state, but however defective the lists may be, by having adhered to the "System of Orthography" prepared by the Royal Geographical Society of London, which excellent and inimitable method enables one to secure a phonetic reproduction, I believe the reader will have no difficulty in pronouncing the words correctly, which is frequently very perplexing with other native vocabularies.

If the language is spoken by an individual who articulates the words correctly, and has a pleasant voice, it is very euphonious, because it not only abounds in vowels, but most words end in one, and none of the consonants have a harsh sound. Perhaps the only exception is the *r*, which in some words is considerably "rolled," but as a rule not to such an extent as to make the sound unpleasant.

To get the correct pronunciation is often difficult on account of the variations of expressions given to certain sounds by different individuals, and can only be obtained from a frequent repetition of the words. In some cases I found it difficult to determine between *a*, *o*, and even *u*, so variably were the words pronounced. This difficulty is still more enhanced by the desire on the part of the natives to attempt to modulate the word, because as soon as they are desired to repeat it they seem to imagine that the word has not been pronounced to one's liking, and alter it; and should you pronounce it ever so incorrectly, they at once agree, and are sure to pronounce it the same way. They are often evidently under the impression that the word is well enough known to the interrogator, who only gives it a different expression, and to please him repeat it in his style; being very quick of hearing, they can repeat almost every sound with a marvellous accuracy.

B and *p*, *g* and *k*, *l* and *r*, and *y* and *j* are often substituted one for the other, so that it became difficult to decide to which letter the sound preponderates; and in certain words it seems optional whether *ng* or only *n* is used.

Frequently a difficulty arises when a word is used in an abbreviated form, or a prefix or affix added; and when an object is shown, and instead of its own name, that of the substance is given it was derived from. For instance, when I wanted to know the name of the nose-stick, I received the one given to the wood it was made of, and when I asked the word for "a leaf," I received the name given to the tree it came from.

The Yunga dialect contains a great proportion of abbreviations in the small vocabulary obtained; from this it appears to me that certain tribes, more than others, are in the habit of shortening their words.

English.	Everard Range.	Blyth Range.	Fraser Range.	Yunga.	Knutsford.	Yaurigabbi.	Murchison.
Nose	Mulla	Mula	Mulla	Mulla	Mulla	Mull	Mulla
Eye	Kallu	Kuru	Mel, Wardu	Miel	Mel	Kula	Kurra
					Gnalla, forehead	Mugga	
Head	Gnulla	Gnulla, Nulla	Kada	Kad	Kada	Mulla, forehead	Mugga
Ear	Pinna	Pinna	Gulla	Dwunga	Kayau	Kulga	Gulga, Kulga
Thigh	Tunda	Tunda	Tunda	Tauel	?	Tunda	Tunda
Foot	Yinna	Yinna	Yinna	Yen	?	Jinna	Yinna
Blood	Dulgu	Algu, Gurru	Yurnin, Yelgu	Gnoap	Yalgu	Yalgu	Yalgu
Breast	Ibi	Elbi	Bebi	?	?	?	Bebi
Sun	Chindu	Yindu	Chindu	Gnanga	Tyundu	Garong	Kaianyu
Water	Kapi	Kapi	Kapi, Gapi	Kepi, Kep, Gep	?	Kapi, Gabbi	Babba
	Muggatti						
Fire	Warru, hot	Warru	Kaiya	Kaila	?	Kulea	?
Smoke	Puyu	Puyu	Voya	Puya	?	?	?
			Taminyi—				
Lips,		Dā, moustache	mouth, lips	Tā, mouth			
Mouth, Tongue	Dā, lips	Dallin, tongue	Talit, tongue	Min, lips	Tga, lips	Gallan, tongue	Dallin, mouth
Wound	Pika	Pika	Mindin	Kwud	?	Kálleya	Pika

Although I have not obtained any information regarding the grammar of the dialects, I am inclined to conclude, from the comparison of the vocabularies, that the language is essentially the same, because many of the principal words are found in all of them, or re-occur at a distance after they have been substituted by another word in the neighboring tribe. To demonstrate this I have tabulated a few of the leading words, and a larger list might be made, but those selected answer the purpose sufficiently.

The correct accentuation of a certain syllable is, no doubt, very important, but a distinct rule for it does not seem to exist. Generally in words of two syllables the accent is laid on the first, and, as a rule, the sound of it is slightly longer. Often, however, no syllable is specially accentuated, and the length or shortness of the vowel governs the accent, either by being more or less dwelt upon or through the modulation of the sound. In words of three and more syllables the penultimate is generally accentuated or dwelt upon. When the case was otherwise, or when a syllable was specially accentuated, I have marked it with an acute accent to denote the stress.

The following amplification of the rules of the Royal Geographical Society's "System of Orthography" will serve as a key to an approximately correct pronunciation of the words:—

Letters.	Pronunciation and Remarks.	Examples.
a	*ah*, *a* as in *father*	Java, Banána, Somáli, Bari, Suákin.
e	*eh*, *e* as in *benefit*	Tel-el-Kebír, Oléleh, Yezo, Medina, Levúka, Peru.
i	English *e*; *i* as in *ravine*: the sound of *ee* in *beet*. Thus, not *Feejee*, but	Fiji, Hindi.
o	*o* as in *mots*	Tokio.
u	long *u* as in *flute*; the sound of *oo* in *boot*. Thus, not *Zooloo*, but	Zulu, Sumatra.
ai	English *i*, as in *ice*	Shanghai.
au	*ow* as in *how* Thus, not *Foochow* but	Fuchau.
ao	is slightly different from above	Macao.
ei	is the sound of the two Italian vowels, but is frequently slurred over, when it is scarcely to be distinguished from *ey* in the English *they*.	Beirút, Beilul.
b	English *b*.	
c	is always soft, but is so nearly the sound of *s* that it should be seldom used. If *Celebes* were not already recognised it would be written *Selebes*.	Celebes.
ch	is always sounded as in *church*	Chingchin.
d	English *d*.	
f	English *f*, *ph* should not be used for the sound of *f*. Thus, not *Haiphong*, but	Haifong, Nafa.
g	is always hard. (Soft *g* is given by *j*)	Galápagos.
h	is always pronounced when inserted.	
j	English *j*. *Dj* should never be put for this sound	Japan, Jinchuen.
k	English *k*. It should always be put for the hard *c*. Thus, not *Corea*, but	Korea.
kh	The Oriental guttural.	Khan.
gh	is another guttural, as in the Turkish	Dagh, Ghazi.
m n	As in English	
ng	has two separate sounds, the one hard as in the English word *finger*, the other as in *singer*. As these two sounds are rarely employed in the same locality, no attempt is made to distinguish between them.	
p	As in English.	
q	should never be employed; *qu* is given as *kw*	Kwangtung.
r s t v w x	As in English.	
y	is always a consonant, as in *yard*, and therefore should never be used as a terminal, *i* or *e* being substituted Thus, not *Mikindány*, but not *Kwaly*, but	Kikuyu. Mikindáni. Kwale.
z	English *z*	Zulu.

Accents should not generally be used, but where there is a very decided emphatic syllable or stress, which affects the sound of the word, it should be marked by an *acute* accent.

Tongatábu, Galápagos
Palâwan, Saráwak.

Vocabulary of three Dialects obtained from the Half-caste, Billy Weaver, living at Warrina.

English.	Wangarabunna.	Diyeri.	Andijiringna.
Come here!	Kauanna, Pitchi ...	Kopperau, Yarra wulkanna	Pitchi
Run!	Minderau	Minderau	
Be quick!	Mindinna	Nurrialla, Bukkali* ...	
Walk, go, go to	Ukunda	Wappina	
Which way?	Wittiarra	Wandeanna, Wudárri ...	
Where are you going to? Which way walk? ...	Wittiarra ukunda ...	Wandeanna wappina ...	
	—	—	
Give it to me	Munyinda	Inginna	
I give you	Umbā munyinda ...	Minni inginna	
Will you give it to me? ..	Umbā munyinda mai ...	Minni inginna mai ...	
What will you take for it? ...	Migna umba mundada kalla	Migna atu inni kalla inginna	
Are you satisfied? (with the bargain)	Umba yuta	Juni malla mundada ...	
	—	—	
I don't know	Annoku	Annoku	
What do you mean? ...	Withiera	Minna	
What way water lie? (Where can I find water?) ...		Wadearra gnappa wappina	
	—	—	
I am a friend (=blackfellow)	Antunni nulla ...	Akonni kurna	
I am very fond of you ...	Atu nuka anyúdda ...	Atu pinna anyúdda ...	
I do	Atu	Atu	
Very much	Nuka	Pinna	
Like you	Anyúdda	Anyúdda	
Old woman	Wulliulla	Willurbuna	
Old man	Mattabudda	Pinaru	
Man	Nulla	Kurna	
Young man	Mattaru	Mattaru	

* Is not a true native word, it is much used in Queensland.

English.	Wangarabunna.	Diyeri.	Andijiringua.
Young woman	Munkárra	Munkárra	
Boy	Wúya	—	
Girl	Kúya	—	
Lazy scoundrel	—	Gnuya	
Eye	Milyardi	Milki	Mialla
Nose	Midla	Mudla	Mulla
Ear	Yarri	Tulpa	
Mouth, lips	Manua	Manua, Tundna ...	
Breasts	Gnamma	Gnamma	Gnamma
Back of neck	Workarra	—	
Teeth	Yakkarra	—	
Bone	Walpu	—	
Blood	Kumári	Kumári	
Hand	Múrra	Múrra	Múrra
Foot	Tidna	Mundaui, Tidna ...	Tinna
Food	Chalpa	—	
Flesh-meat	Karthi	—	
Fire	Makka	Makka, Turu	Karla
Water	Kutha	Gnappa	Kapi
Sandhill	Múdlu	Kunchari,* Daku ...	
Devil	Kumpira	Kuchi	
Moon	Pirra, Pirallă	Pirra	Pirra
Sun	Muyu	Ditchi-punda ... ... (Big star, or as given, star big)	Chindu
Earth	Wadlu	Mittha	
Star	Kardividla, Ditchi ...	Ditchi-wauka ... ... (Star small)	
Creek or river	Kurla	Kurriri	
Mountain, big hill, also stone	Kidgna, Kattiwurru ...	Murda	

* Is also the name of a place at Cooper Creek.

Lightning	Piru	—	
Thunder	Maiawurdli	—	
Rain	Kurarra	—	
Whirlwind	Wilchekuva	—	
Track	Winpa	—	
Gun, or any firearm ...	Mukkati*	Mukkati	
Native hut	Bogunya	—	
Yam stick	Wadna	—	
Wooden vessel (for carrying food or water)... ...	Putu	Pirrā	
To go back	Tikunda	Tikunda	
To camp	Gnura	Gnura	
To sleep	Kudnalunda	Turranna	
To die	Purrunda	Pallina	
To-morrow	Wungarabudo	Tunkabinna	
To-night	Wongna alpuru ...	Tinkauitti	
Directly, now	Karrari	Karrari	
I	Mura	Unna	
You	Umba	Inni	
One	Muyu	Kunu	Maiu (?)
Two	Parculu	Mundru	
Three	Kulbari	Parculu	
Many (more than three) ...	Murrapu	Murrapu	
Yes	Gnarai	Kau	
No	Padni	Padni	
High	Marri	Mari	
Big	Kattiwerru	Punda	
Small	Kupakupa	Wauka	
Very large	—	Tundrapinna	
Fat	Murni	Murni	
Thin	Erónya	Muko (?)	
Good	Gnurku	Umu	
Worthless (no good) ...	Mudlanti	Mudlanti	
Angry	Kulanda	Kula	

* By some is supposed that this word is a corruption of *musket*, but it is evidently derived from *makka*

English.	Wangarabunna.	Diyeri.	Andijiringna.
Red	Mittakka	Muralyi	
Green	Nidluürru	—	
Yellow	Arrumadla	—	
White	Warru	Purlu	
Black	Billabilla	Marru	
North	Tinanangarra	Tidnangarra	Tinangarra
South	Kunnangari	Kudnangari	Kunangari
East	Terriwā	Terriwā	Terriwa
West	Yandauürra	Yandauürra, Yandakurra ...	Yandauürra
Dingo	Mudlayapa	Kintalla, Yappulu ...	
Kangaroo	Kungarra		
Opossum	Wumbula		
Emu	Worrugatti		
Crow	Wukkalla		
Hawk	Kukunga		
Owl	Kurkurruku		
Swan	Kuti		
Blue Crane	Wurru		
Iguana (Varanus Gouldii ...	Karperri		
Jew lizard (Amphibolurus barbatus)	Kadni		
Snake (large non-venomous)	Wummā	Wummā	
Snake (venomous, light grey-yellow belly)	Wiparu	Wiparu	
Large fish (sp. ?)... ...	Markara	Markara	
Small fish (bream ?) ...	Mudlakupa	Mudlakupa	
Box-tree	Piétna	Pattāra	
Grass	Yalpa*	Kuntha	
Saltbush	Boltu	—	

Vocabulary obtained from Natives of the Everard Range Tribe.

Parts of the Human Body.

Gnulla, head
Munga, hair (of head)
Kunya, beard
Pinna, ear
Mulla, nose
Dā, lips
Karsetti, Karditti, teeth
Kallū, eye
Kallū yinbi, eyebrow
Yurri, arm
Malla, hand, finger, thumb
Tunda, leg, thigh (?)
Yinna, foot
Pirri, finger or toe nails
Ibi, breast
Willa, belly
Manna, seat of body
Dulgu, blood
Kumbu, urine
Pika, wound
Pika pilia, circumcision and the slitting of the penis
Chipallé, tatoo scars found on back and chest

Various Objects and Terms.

Chindu, sun
Piya, moon
Kellilpi, star
Chitungu, rainbow
Kapi, water
Muggatti, fire
Muggatti puyu, smoke
Muggatti ella, charcoal
Warru, hot
Biani, cold
Ningna, frost
Papa, the barking of a dog

There was a dog in our camp, and as the native dogs do not bark, but only whine, the word may most likely not mean barking in the sense we understand it, and probably is applicable to the natural sound made by every animal. At first I thought it an exclamation of surprise, because the sound of a dog's bark must have been unknown to the natives; but I am convinced that it is intended for the barking of the dog.

Yinna yanu, to walk
Nurtpa, I don't know
Kaitiu, rock
Kulbi, painting
Katui-kulbi, rock-painting
Puringu-hindu, dog's hair, or fur

The distinction between fur and human hair is to be noted.

Wanna, digging-stick (yam-stick)
Wera, Mika, wooden water-bowl; also used for carrying food and other substances in
Winda (Oinda), spear
Iduru, a strong stick made of heavy wood, about three feet long, and a sharp stone stuck on one end

Used for making weapons and implements, and is also sometimes used for the purpose of knocking down game.

Mira nakata, the wooden spear-thrower

This implement has also a sharp piece of flint fastened at the end near the handle, and is used, like the Iduru, for the purpose of chipping out implements and weapons.

Dula, the cement with which the edged stones are fastened to the above implements

It is the exudation of some Xanthorrhea species mixed with sand.

Ilindi, a burning bunch of grass; faggot
Ō, yes

Zoological Objects.

Malla, spinifex wallaby (Largochestes sp.)
Wainta, opossum
Puringa, dog
Walliputti (Myrmecobius fasciatus)
Kaleya, emu
Wainuti, turkey (Otis australis)
Wilda, eagle (Aquila audax)
Wilu, curlew (Œdicnemus grallarius)
Milka, Cinclosoma castaneonotum
Chitta, nest
Nokum, egg
Chitta minna, nest of (sp. ?)
Milka nokum, egg of Cin. castaneonotum
Mineri, Moloch horridus
Milbelli, Varanus Gouldii
Murlinga, Hinulia Lesueurii
Waura, Diplodactylus sp.
Pigonti, Lygosoma ciliaris
Piur, Rhynchœdura ornata
Jammi, Lialis Burtoni
Binda binda, moth
Wanga, caterpillar

Mako, larva of a large wood-boring beetle or a cossid moth.

Much sought after for food.

Parana, ant
Ebilka, pupa of ant
Wanna ilka, Mamma kalka, the pregnant female of a wood-eating ant.

The abdomen of this insect expands to the size of a small hazel nut, and is quite spherical. It becomes semitranslucent light yellow, and tastes sweet. The blacks are very fond of them.

Murta murta, beetle
Merrui, Curculio sp.
Muldŭn, Longicorn sp.
Kumbumburi, the dark-brown Blattæ living under bark (? Panesthia brevicollis)
Kauwan, Phasma sp.
Yindilka, grasshopper
Billarbi, Paragryllacris deserta

One of the Gryllidæ, living in damp dark places

Kampu, centipede
Koji, earthworm
Opilpi, Apus australiensis

A species of Crustaceæ living in stagnant pools of water.

Pie, Nakaiya, snail shell

Botanical Objects.

Wiyindi, corkbark-tree (Hakea lorea)
Undulla, native poplar (Codonocarpus cotinifolius)
Kirni, Dodonæa viscosa
Kirkin, Myoporum sp. (?)

The flowers of this shrub have a rich scent resembling the perfume of verbena.

Iguarra, mulga (Acacia sp.)
Bunbun, peach-quondong (Santalum acuminatum)
Bunbun kalka, peach fruit
Mongata, peach stone
Bundi, broom (Cassia desolata)
Pila, Chanbi, spinifex (Triodia sp.)
Gilgalla, Iria, rolypoly (Salsola kali)
Puta, grass
Okiri, native tobacco (Nicotiana suaveolens
Mindinga, Parka parka, fructification; also galls
Tindulla, Eucalyptus tessellaris
Tadulla Eucalyptus pyriformis
Mulba, bovistæ, and probably also other species of fungi
Dalli, wood fungus (Polyporus sp.), red
Gurgu tadulla, Gurgu muldul, Kurpi dalli, wood fungus found on casuarina and mulga, brown
Perka, Thryptomue flaviflora, desert desert ti-tree

Vocabulary obtained from Natives of the Blyth Range Tribe.

Parts of the Human Body.

Nullimba, man
Jimba, young man, boy
Nulla, Gnulla, head
Kurru, eye
Mula, nose
Pinna, ear
Kadduru, hair
Kanda, beard
Dā, mustache, lips (?)
Seri (the *s* is very sharp), throat
Wimbindi, lips
Karditti, teeth
Dallin, tongue
Marka, chest
Elbi, teats
Yundi, navel
Wila, stomach
Yambi, shoulder (and upper arm ?)
Yari, arm (upper ?)
Minna, arm (lower ?)
Maira, hand, thumb, and fingers

They have evidently no special terms for thumb or fingers. I rehearsed several individuals upon this.

Milti, nails
Manna, seat
Angalba, hip
Tunda, thigh
Talpa, leg
Matta, knee
Yinna, foot
Yinna mamma, big toe
Yinna ngnalli, small toes
Malla, Mailu, bone
Gnambu, sexual organs

This seems to be derived from Nambu or Gnambu, egg; but it seems to be applied to the penis, scrotum, and testicles.

Algu, Gurra, blood

Pika, wound, bleeding
Wadina, circumcision
Turta yarni, Alladiganti ?, the slitting of the penis

Various Objects and Terms.

Binanni, Yugal, Wadingari, heaven
Yindu, sun
Piya, moon
Gililpi, Yinnani, Yuka, star

The last two names are probably applied to some special star.

Manda, earth, sand
Kaitiu, rock
Wallu, range
Kandi, flint
Wannei, chalcedony
Maddar, ochre
Kapi, water
Warru, fire
Puyu, smoke
Alte, charcoal (ashes ?)
Winda, spear
Kadji, Kujarra, small spear
Turtimba, Turti, Kukarungati, the short, slightly-bent throwing-stick which they always carry in the belt for the purpose of throwing at the game
Meru, the spear-throwing lever
Magulba, the hook of the Meru that fits into the hole of the butt-end of the spear
Kandi, Kundi, Gundi, the stone fastened at the end of the Meru near the handle, and used for shaving implements into shape

Generally a piece of flint. Vide supra.

Gidi, the resinous cement to fasten the Kandi with

Xanthorrhea gum mixed with sand.

Wanne, stout stick, with stone chisel on one end.

Used for throwing at game as well as for working wood.

Wanna, digging-stick (Yam-stick)

This word sounds very similar to Wanne, but there is a distinction. I have never seen the blacks use the Wanne for digging purposes. The Wanna is carried by every one, and constantly in use for the purpose of digging out all sorts of roots or animals. It is a stout stick of about an inch in diameter and from four to five feet long. The one end of it is slantingly tapered from one side, and the point rounded and well hardened in the fire.

Wera (small), Yilgalla (large), wooden bowl to carry food or water in

The Wera is also in constant use as a shovel. After the ground has been loosened by the Wanna, the earth is removed by the Wera, and in a remarkably short space of time a depth of several feet may be reached. I have seen a couple of natives go down with these simple tools a depth of over three feet in less than ten minutes, and secure a Myrmecobius fasciatus from its lair.

Abu, a piece of rock of any formation that may comfortably be held in one or both hands, and which is used for the purpose of grinding acacia and other seeds for food, as well as the pigments that are used to paint the body
Ō, yes
Wila amma, stomach hungry
Chiggen, I have had my share
Angu, sleep, to sleep
Kuka, eat

This word I took for a long time for a corrupted term for cooking, but now believe it to be a genuine aboriginal expression.

Ganba, vomit
Palka, strong, big

Zoological Objects.

Wainta, opossum
Daualpa, small marsupial

Smaller than a kangaroo rat.

Metāka (the long *a* like in late), Largochestes
Malla Kulü (ü like in German *ue*), the young of a wallaby sp. (Petrogale lateralis)
Wallaveru, Wailäura, eagle (A. audax)
Iteranga, hawk
Maurka, pigeon (Ocyphaps lophotes)
Kurkur, owl
Wanna, redbreast (Ephthianura tricolor)
Wangu, nest
Nambu, egg
Kay unga, flown away, to fly away

I got this word when trying to get the gun to shoot a hawk, and kept a black watching the bird.

Murlinga, lizard (Hinulia Lesueurii)
Jindalpa, frilled lizard (Amphibolurus barbatus)
Makobundi, larva of Cossus sp.
Pia, snail shell

Botanical Objects.

Putta, grass

Putta kara, Aristida arenaria

When this name was given to me the black coughed, and made a sign that the Pseeds and awns produced coughing. ,robably Kara means to cough, or getting s[i]ck, vomit.

Wangurna, Eragrostis eriopoda
Elinya, scented grass (Andropogon bombycinus)
Barka, bush, small tree
Ellimai, fig-tree (Ficus platypoda)
Medurtu, pine-tree (Callitris verrucosa)
Undalla, pepper-tree (Gyrostemon)
Wejindi, cork-bark-tree (Hakea lorea)
Waputti, tea-tree (Melaleuca sp.)
Mángatta, peach-tree, quandang (Santalum acuminatum)
Alpa kara, Euphorbia Drummondii
Pulanda, native tobacco (Nicotiana suaveolens)
Malumbumbi, geranium (Erodium cygnorum)
Kauba, Yilkaryilka, Solanum petrophilum
Ilguarra, Puyarra, Ultagumba, Kurpa, mulga (Acacia species)
Minyu, Munyu, Acacia dictyophleba
Waitargo, Acacia salicina
Kabil kabil, Cassia pleurocarpa
Bundi, broom (Cassia desolata)
Yenumba, Dodonæa viscosa, var. lanceolata
Umbagumba, Ultagumba, Grevillea junciofolia
Urdu, Gnaphalium sp.
Ulurla, Helichrysum apiculatum
Gnaugrau, Eremophila latifolia
Geringerin, Sida petrophila
Purarpurar, Ptilotus obovatus
Arbitta, ? Heliotropium
Pudya gauba, Goodenia heterochila (gauba, to vomit ?)
Alla, Altarpa, Eucalyptus pyriformis
Tumbudjumbum, a flower
Wangu, spinifex seed

Probably all kinds of seed ; because—

Wangu means also young plant, small plant, and
Wangu, Scævola depauperata

VOCABULARY OBTAINED FROM SEVERAL NATIVES MET NEAR THE FRASER RANGE, and belonging to various tribes which are friendly *inter se*. They inhabit the districts to the east and west of this locality and to the south to about 100 miles from the coast. To the north-west at Hampton Plains a small tribe is living that is also friendly with them. The habits and language are essentially the same with all of them, but in some instances different terms are applied for the same object. Whenever "east" or "west" is attached to any word it means that it is used by tribes living in this direction from the Fraser Range.

PARTS OF THE HUMAN BODY.

Minnin,* Bulga, Malba, man
Kīja,* Wandi, boy

*The first of these terms are always readily given, but they sound very like corrupted English—from man and kid.

Diurli, woman
Maddal, young woman, virgin
Wanya, little girl
Kāda, head
Yúarru, Gnamba, forehead
Kāda birdi, Kāda wendu, hair
Kāda doran, the chignon-like knob of hair at back of the head, formed by tying the hair back by means of some namba
Kāda namba (nanba, gnanba), twisted string made of human hair, to tie the hair back with

Often very long, going perhaps a dozen times or more round the head and as often crosswise over the chignon. It is also used round the waist to hold weapons and utensils, and for the purpose of suppressing the cravings of hunger it is tightened.

Kāda wurna, head cover, hat
Mel, Wardu, eye
Mel wendu, eyebrows and eyelashes
Mel nimbit, Mel calba, eyelid
Mulla, nose
Kayīyin, the hole in the cartilage of the nose to put the kondel through

Gulla, ear
Taminyi, mouth, lips
Yeri, teeth, jaw
Jirbu yeri, jawbone
Talit, tongue
Angur, beard
Murni, mustache
Gnangur, chin
Nidya, cheek
Kurlu, neck
Kalbi wilyindi, shoulder
Wanga, arm
Wanga ungu, upper arm
Kurkunaki, elbow
Mare, Maia, Maiya, hand, fingers
Mare agu, thumb
Mare kulbut, index finger
Mare kudja, little finger
Mare beri, finger nails
Danga, Jirbu, bone
Waiyul, skin
Gnarka, chest
Bebi (pronounced like "baby"), teats
Narka, Warma, tattoo marks on chest and back
Gambu, back
Mugalla, belly
Nunyit, navel
Tabit, penis
Gnangna, seat
Tunda, thigh
Gora, leg
Yinna, foot
Yinna murlu, heel
Yinna balga, toes
Yinna beri, nails of toes
Murdi, knee
Mugalla birbin, big belly, pregnancy?
Yurnin, Yelgu, blood
Gnāla yurnin, veins
Gnuan, shadow
Mindin, Andan, Derriga, wound, sore
Kurdudu, heart
Yarall, lungs
Gnaldi, liver
Gambitti, stomach
Maryal, small intestines
Dangul, Dardul, Niedi, large intestines
Barda niedi, the fat of the intestines
Gurna, Minyin, excrement, voiding diarrhœa

Various Objects and Terms.

Nalgun, Gnalgun, to eat
Algun, Wotta meauwud, the latter term, I think, means to masticate
Mel nangú, to see
Perridi, to hear
Kurdi, Kudadni, to laugh
Palluli, to cry
Maiya, to sing
Maiya bord, to shout
Woid (?), to whistle
Bungun, to strike
Woedwoea, Annuru, to fly
Gidjibu, to tickle
Billanyināri, to sit down
Maya mirrat, to whistle
Kandun, to smell (sense of smelling)
Mulla karulla, to sniff, blow nose
Mulla kardit, Mulla ninyurbut, to sneeze
Palerngun, Gurtimau, to walk
Palluwed, to lie down
Kudgnalla, Kuballyn, Bukkaman, to sleep
Turnda, to vomit
Gonyin, to paint the body
Mendi, to have pain in the stomach, to be ill, illness
Kakabukka, Mandin, die, dead

The latter word seems to be related to Mendi, illness, and Kakabukka is probably the same as Bukkaman, *i.e.*, fast asleep. It is very likely that these tribes have the same belief as those living in other parts of Australia, namely, that they do not actually die, but only go to sleep, to be changed into another form.

Ō, yes
Kaiannu, one
Kutharra, two
Mangurra, three
Warrul, three, four, and more
Chartudi, manny
Padu padu, five or six (or more?)

When the numbers go beyond three it appears the mind of even the most intelligent become confused. Five they conceive probably better on account of their digits, but six is again incomprehensible to them. I took six Quondang stones and laid them on the ground in pairs, and again in threes, and then taking one away from the five in various groups; each time it was Padu padu.

Kapi, Gapi, Mijal, Walbi, water

The first term is the most commonly used.

Kapi dilbin, rain
Kapi bar, thundercloud, thunderstorm

Kapi kulladunya, rockhole (holding water)
Kaiya, fire
Kaiya voya, smoke
Kaiya bar, Bar, lightning
Irgalyu, charcoal
Bunga, ashes
Mamma ange, thunder
Malga yet, Malga bildi, cloud
Wandurka, Gurrurringa, Kurringa (abbreviation), rainbow
Pika, Birrilla, wind
Yinga orarringa, whirlwind
Tanba, duststorm, whirlwind
Chindu, sun
Burnga, star
Parna, earth
Puri, stone
Puri irrillya, quartz, white stone
Kadji, Winda, spear
Meru, Wordat, spear-thrower
Tadil, Warā, hook of spear-thrower
Baital, the sharp stone at the end of the spear-thrower

Used as a chisel. It is mostly a piece of flint.

Gnora, the cement used for fastening the Baital

It is made from the resin of the Grass-tree (Xanthorrhea), which is mixed with sand and dust.

Kaili (east), Wallena (west), boomerang
Unain, Vergu, message-stick
Yilbar, Kundain, an oval piece of wood nine to twelve inches long, and from two to three inches wide; flat on one side, and rounded on the other, and sometimes half an inch thick in the middle

The flat side is mostly ornamented with carved lines forming various designs. The rounded side is smooth. A hole at one end allows it to have a string passed through, by which it is rapidly rotated through the air, to produce a loud burring sound. This serves to warn the women that some ceremony is going on which they must not attempt to see. The women must not even look upon the yilbar at pain of death; it is therefore carefully hidden from them.

Kondell, Wondarra, nose stick
Balga, Yauwilli balga, Dalgerri yauwilli, Yauwilli talla, a thin stick about four inches long, and pointed on both ends

It is used for pinning the hair together, as well as for piercing holes, &c. Mostly it is marked and ornamented by means of the glowing end of a piece of stick from the fire.

Yari, water or food-bowl, made of wood
Moya, canoe-shaped vessel for water or food, made of a thin sheet of Eucalyptus bark

The sheet of bark is folded on two ends, and the folds gathered and tied with a strip of flexed bark.

Worma, picture etchings on bark

These are done by scratching the green bark on the inner side with a sharp point.

Yindinga, a head ornament used during some dances

It is made of a thin stick, which is shaved down with a sharp stone, the fine shavings being kept attached on one end. At intervals of about four inches, and where the shavings are still fast, these are formed in a spherical, loose ball, their curling allowing them to be easily matted together with the hand. Often the down of birds are put on to these balls, and for further ornamentation the stick on the intervals is colored red with blood. For making this ornament, the young, straight shoots of casuarinas are used, the wood of which is very white, and easily worked. Two are used at the dance, one on each side of the head, rising horn-like about two feet in the air.

Malga mintorat, house, tent, &c.

Verb, "to keep rain out."

Minda, Wanomu, the shelter made by the blacks with bushes and brushwood
Dirgan, Wandamoin, pipe clay
Irrillya, the bright gypsum in its natural state
Dergan, roasted gypsum, and used like pipe clay for painting the body
Pori, Kulbar, a track
Anurru, Murdu, flying, to fly
Maiawangi, Maiwangi, the cawing of the crow
Yurnin, red
Tel, white
Kumma, black
Kuyal, green
Gnalla (Nalla) yera, Gnalla (Nalla) guya, the edible bark of the roots of some mallee in its natural state
Gnalla (Nalla) yindalya, the same after having been dried and pounded to dust, ready to be eaten

Zoological Objects.

Maryurru, spinifex wallaby (Largochestes sp.)
Damma, opossum

Dangu, Myrmecobius fasciatus
Pigurla, kangaroo
Pigurla kade, skull (head) of kangaroo
Kandun, bird (hawk ?)
I showed a black a skin of one.
Gillilka, hawk (Hieracidea occidentalis)
Tulla, emu
Tulla gnambu, emu egg
Gnambu, egg
Yarda, eagle (Aquila audax)
Gurbarru, small magpie (Cracticus nigrogularis)
Yelyel, common magpie (Gymnorhina leuconota)
Yimbalu, black magpie (Strepea sp.)
Banban akamina, Oreoica cristata
Banban gudarra, Oreoica sp.
Wajigga, crow
Barrul, turkey (Otis australis)
Nundi, tail
Mullabutta, snake
Galga, Veranus Gouldii
Nurrill, Billalla, blue-tongued lizard (Tiliqua occipitalis)
Bigúrru, Trachydosaurus rugosus
Yurnga, Odatria punctata (?)
Aballa, Amphibolurus cristatus
Ilgilli, Amphibolurus sp. (?)
Yed, Diplodactylus spinigerus
Barula, Gymnodactylus Miliusii
Boid, Trapidolepisma sp. (?)
Gidda minyin, Moloch horridus
Malda minyin, the knob on the head of M. horridus

Probably Malda means topknot or crest generally.

Mika mika, butterfly, moth
Munbau, large moth (Cossid or Pirales)

Also the larva of same, which is a favorite article of food.

Wandanderi = pupa, Wandanwalla = cocoon, of Munbau
Marditti, the larva of a wood-borer, much smaller than Manbau ; also the larva or pupa of a Psyche. sp.

Both are a favoríte food.

Windurbiddi, the caterpillar of a procession moth

Probably the name given to a caterpillar generally.

Nurnun, beetle
Dallibrindi, Gigadema sp. (Carabid)
Uei, Chrysobothris atrata (Buprestid)
Muragnan, large longicorn beetle (Prionoplid)
Milbar, longicorn beetle (Phoracantha sp.)
Burnar, lamellicorn beetle (Melolonthid ?)
Yidadyi, curculionid beetle (Amycterus sp.)
Minga, ant, small black species
Minnin, ant, brown-bodied, and smelling very pungent
Yindalga, grasshopper
Burdunnũ, Phasma sp.
Binbit, Yirrell, cicada
Warneyad, scorpion
Dardalyung, centipede
Gaira, spider
Barna mamma, ant lion (Myrmeleon sp.)
Birang birang, silver fish (Lepisma)
Tulluyirdal, Blatte sp.
Immir, blatta (Polyzosteria Mitchelli)
Yerbit, Helix sp.
Wialwuda, Bulimus dux

The blacks about the Fraser Range did not know the rock wallaby (Petrogale lateralis), nor the pink-breasted cockatoo (Cacatua los), nor the handsome bowerbird (Chlamydodera guttata). I showed prepared skins of all these to several of the natives.

Botanical Objects.

Pírrini, Scævola oxyclona
Pandīũ, Scævola spinescens
Tau, Dæmia Kempeana

The flowers and buds of this plant are greedily eaten by the aborigines. They taste very like the seeds of the common marshmallow. It is generally considered that the plants belonging to the Asclepiadeæ are poisonous on account of their more or less acrid juice, but this does not seem to be the case with this plant. At least the buds of it are not, for I have eaten a number of them without the least ill effect.

Kurdullu, Cynanchum floribundum
Kurdullu, Marsdenia Leichhardtiana
Udya, Solanum Oldfieldii
Wobu yeri, Solanum orbiculatum
Gambunyöin (Fast), Teucrium fililobum
Gumbu gumbu, Heliotropium asperrimum
Bulgar, sugar-tree, false sandal (Myoporum platycarpum)

This tree sometimes exudes large masses of yellowish-white manna-like gum that has a pleasant and very sweet taste. In spite of this, however, the natives do not care much for it as an article of food, probably

of some laxative properties it may possess. This I concluded from signs made by the native whom I gave some to eat. He ate some, and dissolved some of it in water later on, and drank this; but all he consumed was but little, nothing like that he would have done had he considered it good food.

Wairu, Bulgar yumbu, the gum of the sugar- or sandal-tree

Dumbai,* peach, quandang (Santalum acuminatum)

Miduru, cypress pine (Callitris verrucosa)

Milgar, grass-tree (Xanthorrhea Preissii

Molilli, casuarina, shrub (C. humilis)

Tarlannu, casuarina, tree (C. acutivalvis)

Kararda, mallee, shrub-like kind (Eucalyptus incrassata)

Yulga, grass

Battara, rush (Lepidosperma gracile)

Niurni, Dianella revoluta

Bambul, lichen

Bulbul, Bovista sp.

Yera, root

Ueni, bark

Dalgalla, leaf

Nieru, flower

Milga, fruit, seed, kernel

Daldal, Mindi, prickles or thorns

Also in zoology—for instance, the spines on the back of Moloch horridus.

Gnora milgar, resin of Xanthorrhea

Gnora miduru, resin of Callitris verrucosa

Kari, gum of mallee (Wawalya)

Kauwa yauwilli, Tundul yauwilli, the seed of Yauwilli (Acacia leiophylla)

This, like all other acacia seeds, is used for food by the aborigines. In the interior near most of the rockholes shallow depressions may be seen on the flat-lying rocks, where seeds have been ground for generations, by which the surface has become polished in these places. I think the terms Kauwa and Tundul stand for all similar seeds, and the name of the tree whence gathered from is attached for the distinction.

The gum of Yauwilli is also a favorite food, and always eagerly eaten when found during a day's tramp.

Waiyul, the edible flesh of the peach and other fruits of the same genus. Waiyul means also skin

Vide above.

Nurgu nurgu, Boiya (East), Thysanotus Patersoni

Also the bulb roots of this plant, which are used as food and eaten raw.

Malli malli, Thysanotus Patersoni

The plant and tendrils of it.

Darga, kurrajong-tree (Brachychiton Gregorii)

Chal, roly poly, Salsola kali

Bogarra, lignum, Muehlenbeckia Cunninghamii

Pindan,† Kuyal (East), Geijera parviflora

Yinnaguyal, Gnephosis sp.

The word seems to be a compound of Yinna (foot) and guyal, or kuyal (green), which also seem to designate anything green, *i.e.*, a plant. This would construe Yinnaguyal into a "low plant," one that grows near the feet.

Yalyal, Tecoma australis

Buddad, Maddambur (East), Eremophila latifolia

Daryet, Irdarda, Eremophila alternifolia

Moil-tawari, Eremophila longifolia

Darrul,† Exocarpus aphylla

Darjeru, Alyxia buxifolia

Peiyul, Bandi (East), Melaleuca elliptica

Warralya, Milkupuddi,† Eucalyptus largiflorens, var.

Tundēr, Menno (East), Acacia salicina

Billalla, Kurdening (East), Acacia subcoerulea

Badínni, Waingwaing, Acacia sp.

Mulda mulda, Oxalis corniculata

Dulli dulli, Wunduwundait, Hibiscus Farragei

Wurdun gaidyi, Erodium cynorum

Bindal bindal, Helipterum floribundum

Wandurgundur (East), Erechthites quadridentatus

Warot, Cassia Sturtii

Wallun, Aster sp., shrub

Wardurbitti, Pittosporum phillyroides

Warril, Baru,† Beyeria viscosa

Mulda mulda, Ptilotus spathulatus

This name, also given me for Oxalis corniculata, makes me think that Mulda mulda is a term for any low-growing plant which is not specially named, or for which the name is unknown by the native asked. As anyone might say "a weed" that wished to generalise.

* Names marked thus are also used to the east of F. R.; those marked † are also used to the west of F. R.

Tudjinundinundi, Ptilotus obovatus
Tudyumbumbu, Ptilotus hemisteirus
Tudynurndundi, Ptilotus Drummondi

These three names are given to either of these plants, and probably variations of the same term or sound.

Tillol, Atriplex stipitatum
Niuenning, Rhagodia crassifolia
Wandundait, Rhagodia spinescens var.
Buddani, Malnoyi, Pinda, Kochia sedifolia
Mindi mindi (East), Tetragonia expansa
Parka, "mallock poison" (Gastrolobium sp.
Kummenok, Gastrolobium bilobum
Wondari, Wandai, Pimelea microcephala
Milbar, Cassia eremophila
Mori, Daviesia aphylla
Durgun, Pluchea conocephala
Yinnuelma, Helichrysum ambiguum
Gunthur,† Kundur (East), Helipterum tenellum
Gambunyoin (East), Teucrium fililobum
Yinyin, Stipa elegantissima

Vocabulary of Hampton Plains Natives obtained from a Black who accompanied us a few days.

Yedda, Mulläudda, snake (Pseudechis australis)
Undin, leaf
Dalgalla, leaf, small branchlet
Nieru, flower
Welbu, the dead outer bark of Eucalyptus trees, which is sometimes hanging down in strips
Weini, the inner fresh bark
Narda, the notch cut into the bark for climbing a tree
Waralya, Eucalyptus largiflorens
Malinya, " salmonophloia
Kararda, " incrassata
Dalbarra, " sp.
Dang, " sp.
Gungurru, " cæsia

The roots of this Eucalypt are eaten. Probably also those of some of the others. Many of these Eucalypts yield a deal of water from some of the roots. The blacks know well how to chose the right roots at once, and must know certain marks about the tree to guide them, which, however, I could not get explained. I found some roots myself that yielded water, but found them by accident rather, because a number that I dug up yielded none.

Medduru, Callitris verrucosa
Bulgar, Myoporum platycarpum
Dumbai, Santalum acuminatum
Yogo, Brachychiton Gregorii
Karbabi, Alyxia buxifolia
Warril, Beyeria viscosa
Daryet, Eremophila alternifolia
Beddula, Acacia Meissneri
Yauwilli, " leiophylla
Murrun, " sp. (raspberry jam wood)
Mori, Daviesia aphylla
Burdanni, Pluchea conocephala
Malloiyi, Atriplex nummularium
Biul, Melaleuca sp.
Bugai, "
Dail, Scævola oxyclona
Nurgu nurgu, Thysanotus Patersoni
Gundulli, Grevillea Helmsiana

Red flowering, with decumbent branches.

Guru, Billardiera cymosa

The fruit of this plant is eaten by the aborigines. Between the Fraser Range and coast, I am told, the plant occurs abundantly in places.

Gnora, the resin of Xanthorrhea
Woia, a salt lake (Lake Lefroy?)

Vocabulary of the Yunga Dialect obtained from a Native named Wainbret.

Parts of the Human Body.

Bardok, name given by the Yunga to the tribes living inland.

These circumcise and slit the urethra, which the Yungas do not.

Djabbin, circumcision
Paiyan, the slit, and slitting, of the penis
Yunga, man
York, woman
Kulong, boy, little fellow
Bindi, young woman, virgin
Nuggal, girl, daughter
Mamnau, father
Iūgun, sister
Gnangan, mother
Gnundun, brother
Bidding, osn

Demman, grandfather
Mäôn, grandmother
Kad, head
Pāb, forehead
Gnoanda, hair
Mîel, eye
Mîel biggard, eyelid
Mîel gnoand (verb.), eye-hair, eyebrows, and lashes
Dwunga, ear
Mulla, nose
Tā, mouth
Min, lip
Gnallok (also sometimes Gnālok), teeth, jaw
Gnenok, beard
Gnanber, chin
Munk, shoulder
Wurrnok, upper arm
Gnoi, elbow
Marrak, lower arm
Mar, hand and fingers

This seems simply an abbreviation of Marrak.

Pieri, nails of fingers and toes
Yid, chest
Kurpul, belly
Goad, navel
Gnōlorr, back
Tauel, thigh
Purnith, knee
Marta, lower leg
Wullit, calf of leg
Yen, foot
Bilgut, knuckle of ankle
Tand, heel
Meid, penis
Teid, vagina
Biggot, skin
Gnoap, blood
Kurrak, veins
Kurd, heart
Waggar, lungs
Maia, liver
Tiub, kidney
Mūr, seat
Kwud, wound

Various Objects and Terms.

Woalu, heaven
Gnanga, sun
Wial, moon
Warrit, star
Märr, cloud
Niurrdong, rainbow
Kepi, rain
Kepi mamma, thunder
Wirgu, lightning
Morruk, north
Mannong, east
Gnaddi, south
Winnung, west
Wammongat, ocean

Abbreviation Wammong, which is generally used.

Pudyar, land, earth
Poi, rock
Karda, hill, mountain
Kepi (abb. Kep., Gep.), water
Karla, fire
Puya, smoke
Kein, one
Kudjin, two
Marding, three
Purring, four
Gumbar, ten (two hands)
Bardek, many
Kawan, plenty
Gnan, I
Guindok, you
Ball, he, she, it
Gnuppilong, red
Daond, white
Turdong, green
Nuggal, small
Mulgan, cold
Yekla carrang, it is hot
Jummingin, to see
Kárdidyin, to hear
Perangin, to feel
Kwŭbātak, to taste
Mūngull, to fly
Murdigangul, to walk quick, run
Guaning, to eat
Kedji, spear
Kaili, boomerang

Zoological Terms.

Weid, emu
Kuli, turkey (Otis australis)
Gnaond, feather

Botanical Terms.

Buna, tree
Baddaich, big tree
Yubal, bark
Noal, flower
Pial, leaf
Willora, quandang (Santalum acuminatum)
Darrul, Exocarpus aphylla
Pindan, Geijera parviflora
Bindalla, Alyxia buxifolia
Galgulla marpu, Cynanchum floribudum

Markauy.ndi, Dodonæa microzyga
Kummenok, Gastrolobium bilobum
Parka, Gastrolobium sp.
Mindiit, Cassia eremophila
Wiwurra, Aster sp., shrub
Yandi, Helichrysum apiculatum

Vocabulary obtained at Knutsford, W.A.

Kapun bordu, man
Mirga, woman
Kauwan, boy
Mula, girl
Minya, baby
Kada, head
Gnalla, forehead
Kada warna, hair of head
Mel, eye
Mel gnambu, eyebrow
Mel gnamba, eyelashes

Had these terms several times repeated to me, and on each occasion the distinction was made.

Nangu, beard
Muni, moustache
Tga, lip
Yeri, teeth, incisors
Gnalli gnalli, teeth, molars
Mulla, nose
Kayan, ear
Yalgu, blood
Mandatte, veins
Molla, heart
Gnanbukka, lungs
Gnurna, arm
Gurgun, elbow
Maia, Munyurdu, fingers
Benyi, nails of fingers and toes
Tyundu, sun
Piya, moon
Bungu, star
Gnalla (*vide* Gnalli above), to eat
Woda, to spit
Nulbu, to sneeze
Kutta, one
Kutarra, two
Mangurru, three
Wilarra, four
Wilarroa, five

After this my informant compounded the numbers, but the counting was getting somewhat confused.

There seems to be very little difference between Wilarra and Wilarroa, but this distinction was made each time I had the words repeated.

Wolanna, boomerang
Wila, the flat side of the boomerang
Yurdu, the convex side of the boomerang

These distinctions of the shape of this implement are very interesting. There seemed to me also some special terms for the twist and bend of it, but I could not get at the correct meaning of it.

Vocabulary obtained at Yaurigabbi, W.A., from a Native called Kuma, who came from the country lying further to the east and which he called Yolla.

Parts of the Human Body.

Murdyi, blackfellow
Yemmayi, man
Midji, woman
Gudja, boy
Mugga, head; also hair of head
Nulla, forehead
Kula, eye
Mull (abb. of Mulla?), nose
Kulga, ear
Augu, whiskers
Yira, jaw
Niinga, neck
Eri, teeth
Gallan, tongue
Bilan, chest
Bilgi, upper arm
Nuran, elbow
Jilli, forearm
Marra, hand, fingers
Mammarra, thumb
Tunda, thigh
Yungul, hip
Gunna, seat
Mambu, leg
Judda, knee
Jinna, foot, toe
Mamma adra, big toe
Warri, belly
Mairi, liver
Bunda, kidney
Kurdudu, heart
Yalgu, blood
Gumbu, urine
Karnu, fat
Wilu, penis
Wila, vagina
Yiga, bone

Kálleya, small wound, scratch
Warella, spear-wound
Wilu, circumcision

This word signifies also penis, and it is likely that there is another word to be attached to this which Kuma perhaps did not know, although he asserted that there was not.

Various Objects and Terms, &c.

Garong, sun
Wila, moon
Bundarra, star
Munduda, cloud
Burne, land
Kapi (Gabbi ?), water
Kulla, fire
Windya, wind

This word sounds remarkably like corrupted English, which I take it to be, although assured to the contrary.

Doui, hot
Murdi, cold
Burang, good
Dadda, bad
Wumma, eating ; to eat
Gulyi, to be hungry
Dabingalla, drinking ; to drink
Nōă, to see ; seeing
Nugarri, to stand ; standing
Niin, to sit ; sitting
Mulla, to kill ; killing
Gudia, one
Gudarra, two
Mangu, three
Gudaguda, four

This evidently means two twos.

Yalba, five
Kedji, spear
Meru, spear-thrower
Murda, stone
Murlu, kangaroo
Muban, dog
Yallabi, emu (Dromaius Novæ Hollandiæ)
Kara, crow
Waida, hawk
Burdura, turkey (Otis australis)
Gnau, egg
Bibin, nest
Milu, lizard (Egernia depressa)
Bunga, Veranus sp.
Kurrunguru, lizard (Amphibolurus barbatus)
Wunnayilinga, scorpion
Minga, ant
Gurragurra, fly
Winda, a tree

Vocabulary obtained from several Blacks of the Murchison Tribes.*

Parts of the Human Body.

Mugga, head
Kullawell, hair of the head
Gnangun, beard
Mullangun, moustache
Mimmindyi, eyebrows and eyelashes
Kurra, eye
Mulla, nose
Gulga, Kulga, ear
Nalgura, cheek
Dallin, mouth, tongue
Wurdi, lip, tongue
Wilga, teeth
Pidderi, shoulder
Wardu, back
Gnarka, chest
Kardi, upper arm
Gnungor, elbow
Yamma, lower arm
Marra, hand
Walgur, wrist
Nilgil, fingers
Mamurdura, thumb
Mindi, finger nails
Bebi, breast
Minni, teats
Warri, belly
Wilo, penis
Guldo, scrotum
Muni, vagina
Nundi, seat
Tunda, thigh
Burru, knee
Mambu, leg
Walla dargum, ankle
Yinna, foot
Dungul, heel
Yinna warri, sole of foot
Nilgil, toes
Mamurdura, big toe
Milga, Kurdudu, Gurdudu, heart
Doru, lungs
Máreri, Bigan, liver
Bonda, kidney
Wari, stomach
Wilgu, intestines
Billa, fat

* A portion of this Vocabulary was lost.

Yalgu, blood
Kordilari, circumcision
Gnār, slit of the penis
Pika, wound

Various Objects and Terms.

Kaianyu, sun
Banna, earth
Babba, water
Babba wanyi, rainwater tumble down
Wanyi, tumble down
Kulba, spear
Biakka, Cacatua los
Wullää, pigeon (Ocyphaps lophotes)
Maka, horn
Dyilgaru, Hakea Preissii
Ulurbi, Hakea sp.
Meru, spear-thrower
Kaudi, the sharp piece of stone fastened at the end of the Meru
Parru, the cement to fasten the stone

Resin of Xanthorrhea mixed with sand and dust.

Pimbu, the hook of the Meru
Galga, barb of spear
Yëi, head of spear
Wardu, native willow (Pittosporum phillyroides)
Burdārk, Acacia sclerosperma
Dunna dunna, Plagianthus Elderi

Descriptive Vocabulary of some of the Words in use of Aborigines living round the south-western coast of Western Australia, mainly obtained through the assistance of C. A. Paterson, Esq., at Perth.

Mamma guārna, the almighty

Verb, father of all. Mamma implies something high, lofty, or sublime. Ex., Kotta mamma, a high hill, mountain. Kotta also implies always something elevated, head, hill. A native if asked whether it was true what he has stated will answer, Bunna, true. If the question is repeated, as if his word was doubted, he would probably say, Kummijie, very true (often contracted to Kum). If still doubted, he will solemnly say, Mamma kallidj, father understands.

Jingi, or Jinki, the evil spirit or fear-inspiring being, something akin to our devil

When cattle were first introduced the natives called them Jingiringi, from the great fear these horned beasts inspired them with. This word is now corrupted into Yongerunga.

Budyara, ground, earth, sand, land
Up, place

Used as an affix. All names of places to the south of Perth end in the syllable of *up* (place). Pinjarra should be written Pinjarrup, Mandurah be Mandurup, &c. In the eastern districts, as far inland as Beverly, and perhaps further, the ending *ain* (often spelt ine) is equivalent to *up* of the southern and coastal tribes. If a black were asked, Gnun up nyun budyara? (What place your ground? [Where do you come from?]), his answer would be Daldalup, Daldal place, or whatever other up he might come from.

Wulnar, sea
Darabal, estuary
Belu, river
Gnunga, sun, star

A day is expressed by "a sun." If a native wishes to say two days, he says, Kuyal gnunga (two suns). The time of the day he describes by the position of the sun. If he, therefore, makes an appointment, he will point in the direction where the sun will be at the time, and expresses himself thus, Gnunga alli gnaitch yul (Sun there I come). The blacks have a correct knowledge of the cardinal points of the heavens.

Yiral, North
Buyal, South
Gungal, East
Wurdal, West
Mikki, moon
Marr, clouds, wind, heaven
Muko, rain
Gabbi, water
Karla, fire
Munark, heat, hot
Munark kabullara, very hot

Bulla means many or a lot, and the prefix and affix seems to be joined to the word to give it more emphasis.

Kurrajil, cold

The r's are much rolled in this word, implying the derivation of it from shivering and chattering of the teeth.

Buyi, stone.
Bunnu, tree, also a stick, or wood
Kibera, ship
Maorain, food as a general term
Dadger, flesh food, including fish food—special term

A black asking for food, says, Gnun marrain gnaitch gnung (You food me give) If bread is offered, and he wants meat, he says, Gnaitch dadger yulup (I flesh hungry).

Maia, native hut

Applied to house (?)

Mammarup, man

Evidently "father of a place," which may imply "the owner of the soil," although no land is owned by individuals, as all is tribal property. The *r* is interpolated to make the word easier to pronounce.

Gnungna, black man
Genga, white man
Yakko, woman
Mamma, father
Mame, mother

This word sounds very like that for father, but is not pronounced with the same emphasis, wherein the main difference lies. It is also used as parent in the general sense.

Gnungan, mother
Kardu, wife or sweetheart

Only applied to white man, but sometimes used when speaking about themselves when endeavoring to explain their relationship to the whites. There are no special terms for husband and wife in the black's language. The man speaks of his wife as his woman—Yakka; and the woman of her husband as her man—Mammarup.

Kulong, child of either sex
Katta, head or hill
Chua, hair

General term also, as well as the twisted string made of it.

Mel, eye, to see, seeing
Mulya, nose
Bulbira, piercing of the nose
Twonga, ear
Da, mouth, lips
Nalgo, teeth, to eat, eating
Gnaitch marrain nalgo, I, food eaten
Dallang, tongue
Gnurnga, beard
Wardu, throat
Bugal, back
Munga, shoulder
Marra, arm
Mara gnunga, fingers
Biri mara, finger-nails
Marraga, hand and fingers
Minga, chest
Gnundu, man's breast
Bibbi, woman's breast, teats
Ngambarn, tattoo scars, tattooing
Kurt, heart
Daragarl, lungs
Chupu, kidney
Gobbel, stomach, belly

This word is evidently adapted from the rumbling noise in the stomach, of which the blacks so frequently are troubled with when they are short of food.

Murnu, seat
Gndlyara, anus
Tyundu, Mida, penis
Yadyu, testicles
Djidji, semen
Dardi, vagina
Mūyong, sexual connection

This word illustrates the motion of this act, and is generally repeated. Example, Gnaitch alli yakko bulla mūyong! mūyong! (I that woman much, &c.).

Gumbu, urine
Gūāna, excrement
Bal guana dabbat, the excrement left or dropped
Daual, thigh
Daual gidgi, spearing the thigh
Matta, leg
Burnich, knee
Yinna, foot
Yinna gnunga, toes
Biri yinna, toe-nails
Gnaitch, I, my, mine, what

Ex., Gnaitch yinna, my foot; Gnaitch nĭura kwilla, what your name?

Gninnong, thou, thy, thine

Generally abbreviated to gnin.

Bal, he, she, it, his, &c.
Kwabba, good
Windu, bad
Boyera, wicket
Bunno, true
Kwibbel, untrue, untruth, to steal, doing something unfair
Mindich, sick, ill, out of order
Kattidjbust twonga mindich, understand not, ear sick

If a black cannot or will not understand.

Kattidj, understand
Bust, not
Nalgo mindich, toothache
Wardu mindich, sore throat
Gobbel mindich, stomach ache, &c.
Dwarda, dog
Yokkain, dingo
Yauart, large male kangaroo
Warru, large female kangaroo
Kardok, yearling male kangaroo
Kauart, yearling female kangaroo
Gnunip, young kangaroo in pouch
Kupbardong, young kangaroo.

Kupbardong means the young, or the youngest, and applies equally to men as well as other beings.

Kulong, younger (comparative)
Burngup, wallaby
Wallin, kangaroo-rat
Gumal, Gnulbon, opossum
Gumal chua, the twisted string made of opossum hair

Much used, but not prized like the chua of human hair.

Wadji, emu

Often abbreviated to Wadj. Gnalyara wadj, anus of emu, is a gross insult to a black. They also do not like to be called Matta wadji, the leg of an emu; but Mal wadji, the eye of an emu, is the greatest compliment one can offer a native. The emu is highly valued by the natives on account of the food it yields in the shape of eggs, as well as flesh, and on account of the feathers, which are used as tufts on the head and for other ornaments. Besides that they are always put into the incisions to raise the tattoo scars.

Mulak, black cockatoo
Jilak, black magpie
Bibbilya, bustard

These three names are taken from the natural cries of these birds.

Kuljak, Malyi, swan
Kattarr, musk duck
Wunana, wild grey duck
Puttarlung, pelican
Nuna, black snake
Buyia, turtle
Gulgutta, mullet
Grurnan, Gumba, great, large, big
Nimap, small
Wuri, long
Kurat, short
Gnun, who, what
Winyi, or Winyal, where

A word frequently used.

Kaen (pron. cane), one
Kuyal, two
Bali kuyal, three
Bali bali kuyal, four

Bal means he, it, &c. Therefore Bal and Kuzal means It and two=three; Bal bal kuzal, It, it, and two. Beyond that everything is Bulla, many, a lot. From this it will also be seen that they have no special words for three or four. The affix of *i* to bal is for the purpose of producing a better sound, as is the frequent practice with the natives. *Vide* Kabullara.

Kwilla, name

Each native has a name, besides the tribal name, given to him by his parents, which is generally connected with something specially that is found or has occurred at his place of birth. They will often change names with one another on great occasions, as a token of friendship. and are very proud to be permitted to do so with well-known white men, by which means they acquire some prominence among their own people, and at the same time prefer their fidelity upon the white.

Kaili, boomerang
Dauark, a solid round stick, slightly curved, and about 1 ft. 10 ins. long, slightly notched at one end for a handle

This is used for throwing at small game. The blacks are very expert with this weapon, and throw it vertically to make it jump off the ground, and turn from tip to tip. By this means they are able to kill a quail when the bird is just rising.

Gidji, spear, to spear, to penetrate, to pierce

Also used figuratively. If, for instance, a native observes a clandestine coition, he may express himself in this way—Gnaitch mel alli yakko kwibble gidji, I see that woman steel spear. (*Vide* Kwibble and notes on adultery.)

Miyir, Miro, the lever for throwing the spear
Wunda, shield
Dulyung, feast
Kakkarra, dancing after a feast
Bukal, the grave

EXPLANATIONS OF PLATES.

Plate.

VIII. Boy of Fraser Range tribe.

IX. Rock-paintings at Arcoeillinna rock-shelter.

X. Rock-paintings near Wa-wee waterhole, and marks on rock-surface near waterhole in cleft at Camp 12.

XI. Rock-paintings in rock-shelter near Mount Illbilie Soakage.

XII. Rock-paintings on face of sandstone-escarpment, situated about 30 miles south from Camp 4.

XIII. Rock-paintings on flat face above rockhole, situated about five miles south-west from Camp 5.

XIV. Fig. 1, *mira-nakata*, Everard Range tribe; fig. 2, *meru*, Hampton Plain; figs. 3 and 4, *mero*, Murchison District; fig. 5, *chisel*, Murchison District; figs. 6 and 7, *throwing-sticks*, Murchison District; fig. 8 ———— ?, Murchison District.

XV. Fig. 1, *yindinga*, Fraser Range ; fig. 2, *kondell*, Fraser Range ; fig. 3, *unain*, Fraser Range ; fig. 4, *talla* (two views), Fraser Range ; figs. 5 and 6, *balga*, Fraser Range ; fig. 7, *bone-awl*, Murchison District ; fig. 8, *bone nose-stick*, Murchison District.

XVI. Figs. 1, 2, and 3, *wormas*, Murchison District ; fig. 4, *spear-head*, Everard Range ; fig. 5, *spear-head*, Murchison District (this kind of spear is used by all tribes from Everard Range to the Murchison District) ; fig. 6, *moya*, Fraser Range.

XVII. *Yilbars*, Murchison District.

XVIII. *Shield*, Murchison District.

XIX. Game-trap, seen near rocky hill, about four miles from Camp 6.

XX. Markings on chest of natives from the Blyth Range, Barrow Range and Victoria Desert tribes.

XXI. Male of Everard Range tribe, showing hair tied up.

XXII. Male of Barrow Range tribe, showing markings on chest, and having the hair burnt off in front.

XXIII. Male of Barrow Range tribe, showing chest decorations, and having the hair singed off.

XXIV. Male of Victoria Desert tribe, showing decorations, &c.

XXV. Male of Victoria Desert tribe, showing covering to the penis.

XXVI. Male of Fraser Range tribe, showing fur of certain marsupial tails in beard and hair.

XXVII. Male of Fraser Range tribe, with *yindinga* and *kondell*.

XXVIII. Female of Fraser Range, depicting the method of carrying a child.

XXIX. A group of Barrow Range natives, returning thanks for gift of meat at camp near Mount Squires.

XXX. A wurlie, with three males of the Everard Range ; the middle and right figures with a roll of tobacco between their lips ; also wooden *mikas*.

XXXI. Three young males of the Everard Range tribe.

XXXII. Group of men of the Blyth Range tribe, sitting.

XXXIII. Group of men of the Blyth Range tribe, standing.

XXXIV. Young male of the Fraser Range tribe, not yet circumcised.

XXXV. Adult male of the Fraser Range tribe.

XXXVI. Six-fingered female, Fraser Range tribe.

XXXVII. Group of women, Fraser Range tribe.

XXXVIII. Mother and son, the woman showing child-bearing marks, Hampton Plain tribe.

XXXIX. Adult male of the Hampton Plain tribe.

BOTANY.

(PHANEROGAMS AND VASCULAR CRYPTOGAMS).

By Baron F. von MUELLER, K.C.M.G., M.D., F.R.S., &c.,
and Professor RALPH TATE.

Despite the fact that a very large tract of the country traversed by the Eider Exploring Expedition had been previously investigated for its botany, the collection made by Mr. Richard Helms, the Naturalist to the Expedition, assisted by his colleagues, contains a relatively large number of new species, has considerably augmented the list of West Australia plants and furnished material for the better definition of some species hitherto incompletely described.

The numbers of new species are for South Australia one (*Capsella villosula*), and for West Australia eighteen.

The addition to the South Australia flora is one (*Cyperus laevigatus*), in addition to the new species.

The additions to the list of species inhabiting the Province of West Australia, less those descriptively new, are the following thirty-five:—With two exceptions, *Canthium oleifolium* and *Schoenus aphyllus*, all are characteristic Eremian plants having their metropolis in the dry interior of South Australia; *Kennedya prorepens*, *Anthobolus exocarpoides*, *Tecoma australis*, and *Eriachne scleranthoides* are saxatile species of the basin of the Upper Finke, extending to the botanical outlier of Barrow Range; the low-land species, *Phyllanthus lacunarius*, *Polycarpaea Indica*, *Euxolus Mitchelli*, *Brachysema Chambersi*, *Acacia patens*, *Didiscus glaucifolius*, *Podolepis canescens*, *Helichrysum Ayersi*, *Solanum Sturtianum* and *Teucrium grandiusculum* extend beyond the confines of South Australia to Cavenagh and Barrow Ranges; but *Stenopetalum velutinum*, *Euphorbia erythrantha*, *Thryptomene Maisonneuvii*, *Helipterum Fitzgibboni*, *H. stipitatum*, *Dicrastylis ochotricha* and *Eremophila Gibsoni* reach into the Victoria Desert; whilst *Dodonaea filifolia*, *Saponaria tubulosa*, *Chenopodium rhadinostachyum*, *Muehlenbeckia polygonoides*, *Glycyrrhiza psoraleoides*, *Loranthus gibberulus*, *Helipterum Troedeli*, *Daemia Kempeana*, *Solanum eremophila*, *Teucrium sessiliflorum* and *Eremophila Paisleyi* extend to Fraser Range or a little beyond.

The collection submitted to us contains about 800 species, but the material available has in many instances among the larger genera not been adequate for specific determination, hence the number of actually recorded species is only about 700. A few presumable novelties are reserved for further study.

Where no collector's name is appended to a geographic record, that of Mr. Helms is to be considered to have been omitted. The names of by-workers are however given, of these may be mentioned Mr. P. A. Gwynne, who collected from Fraser Range to Esperance Bay and to whose zeal we owe an interestiug supplementary collection, and to Mr. D. Cumming, who accompanied Mr. Wells on a flying-survey from Annean Station on the Upper Murchison-river to the eastward as far as long. 124° 31′, and gathered 55 species, but of these only three are supplementary to the main collection.

The geographic positions of the recorded stations are indicated on the geological map accompanying this volume. The word "Camp" is generally abbreviated in the text of this report to "C," thus C. 22 stands for Camp 22.

DILLENIACEÆ.

HIBBERTIA GLABERRIMA, *F. v. M.* S.A., Everard Range, at 2,000 ft. elevation.

HIBBERTIA ROSTELLATA, *Turcz.* W.A., near Boorabin. The stamens are disconnected, but by gradual turgescence of the maturing fruitlets, may be pushed into clusters of threes, yet without forming real bundles by any concrescence of filaments. Ovularies occasionally only four. To judge from the very imperfect but authentic material in the Melbourne Herbarium, *Candollea uncinata*, Bentham, belongs to this species. The externally very similar *H. recurvifolia*, Bentham, has lately been found inland as far as Youndegin by Miss Alice Eaton, and near Parker's Range by Mr. Edwin Merrall.

Var. RECTIFOLIA. W.A., Victoria Desert (C. 59),on sandhills. This plant has almost straight or only slightly curved leaves, and with peduncles about as long as the calyx, but otherwise not different from *H. rostellata;* the mature carpels are smooth and shining, each with one ripe reniform seed. Precisely the same form was gathered in Giles' Third Expedition near Victoria Spring.

HIBBERTIA GLOMERATA, *Bentham.* W.A., between Red Hill and Yilgarn.

HIBBERTIA HUTTII, *F. v. M.* W.A., between Red Hill and Yilgarn.

LAURACEÆ.

CASSYTHA GLABELLA, *R. Brown.* W.A., near Karoling.

CASSYTHA MELANTHA, *R. Brown.* W.A., Victoria Desert (C. 56).

CAPPARIDEÆ.

CLEOME VISCOSA, *Linné.* S.A., Warrina. W.A., C. 24; lat. 27° 5′, long. 119° 15′ (D. Cumming).

CRUCIFERÆ.

SISYMBRIUM TRISECTUM, *F. v. M.* S.A., Cootanoorina; Upper Arkaringa Creek, with large white flowers; W.A., Fraser Range.

SISYMBRIUM NASTURTIOIDES, *F. v. M.* S.A., Cootanoorina; Arkaringa and Upper Arkaringa Creeks.

ERYSIMUM BREVIPES, *F. v. M.* S.A., Arkaringa Creek; W.A., Fraser Range.

ERYSIMUM BLENNODIA, *F. v. M.* S.A., near Arkaringa Creek.

STENOPETALUM VELUTINUM, *F. v. M.* A nearly glabrous variety, with shorter pedicels and pinnatifid leaves. W.A., Camps 53, 54; near Mount Squires; also at Pidinga, S.A. (R.T.).

STENOPETALUM LINEARE, *R. Brown.* W.A., Fraser Range.

STENOPETALUM SPHÆROCARPUM, *F. v. M.* W.A., 80 miles south of Victoria Spring (C. 64).

MENKEA SPHÆROCARPA, *F. v. M.* S.A., Cootanoorina and Arkaringa Creeks. Some of the plants have white petals. The fruits are too young for determining absolutely the specific position. Mr. Merrall has sent this species from the vicinity of Parker's Range; pedicels occur hardly twice as long as the matured fruit.

CAPSELLA COCHLEARINA, *F. v. M.*, var. OCHRANTHA. S.A., Arkaringa Valley.

CAPSELLA VILLOSULA, *sp. nov.* S.A., Arkaringa Creek. Annual, dwarf, erect; much beset with simple, very spreading hairlets; leaves nearly all radical, broad-linear or narrow-elliptic, but gradually attenuated into the petiole, entire, or some slightly denticulated, always blunt; flowers corymbosely crowded, "emitting a perfume like hawthorn, mixed with heliotrope;" pedicels soon longer than the flowers; sepals spreading, outside pilosulose; petals bright-yellow, longer than the calyx; anthers yellowish, ellipsoid recurved; style conspicuously longer than the stigma; ovulary pubescent; fruit small, ellipsoid-oval, lobeless; the valves boat-shaped, the septum in the narrow diameter; two or three seeds in each cell. From two to five inches high. Stem usually simple. Radical leaves to one and a half inches long and quarter-inch broad, less pubescent than the stem and pedicels; stem-leaves diminutive, usually narrow, often undeveloped. Petals hardly one-eighth inch long, elliptic-cuneate. This species stands

nearest to *C. Andreana*, but differs in much longer hairlets, in almost leafless stem, in larger radical leaves, in color and size of petals, in anthers proportionately less broad, and in conspicuity of style.

LEPIDIUM PHLEBOPETALUM, *F. v. M.* S.A., Cootanoorina and Arkaringa; W.A., Victoria Desert (C. 53), Victoria Spring.

LEPIDIUM PAPILLOSUM, *F. v. M.* S.A., Cootanoorina, Arkaringa; W.A., near Mount Squires.

Lepidium leptopetalum has been sent by Mr. Streich from Nannine, Murchison Gold-field, W.A.

VIOLACEÆ.

HYBANTHUS FLORIBUNDUS, *F. v. M.* W.A., Victoria Desert (Camps 57, 58), Fraser Range.

HYBANTHUS ENNEASPERMUS, *F. v. M.* S.A., near Arcoeillina-Well; W.A., near Mount Squires.

PITTOSPOREÆ.

PITTOSPORUM PHILLYROIDES, *DeCand.* S.A., Upper Arkaringa Valley. "A tree of exceptionally fine growth, attaining to a height of 30 feet, with a trunk of 12 inches in diameter and of about five feet to the branches. It resembles a weeping-willow, and covers an area of 20 feet diameter." W.A., 30 miles S.S.W. from Mount Watson, Fraser Range and Murchison district.

Var. Young foliage silky-pubescent, leaves shorter, broader, obtuse, and stiff; a small tree up to 15 feet high. S.A., Upper Arkaringa Valley.

BURSARIA SPINOSA, *Cavanilles*, var. INCANA. W.A., near Lake Deborah. "A shrub 10 to 12 feet high."

MARIANTHUS LINEATUS, *F. v. M.* W.A., Victoria Desert (C. 54, 64). "Climbing 8 to 12 feet on mallee."

SOLLYA HETEROPHYLLA, *Lindley.* W.A., Mount Ridley, between Fraser Range and Esperance Bay (P. A. Gwynne). The fruit, called "gurnu," is eaten by the natives of Hampton Plain (D. Lindsay).

ELATINEÆ.

ELATINE AMERICANA, *Arnott.* W.A., between Red Hill and Yilgarn.

HYPERICINÆ.

HYPERICUM JAPONICUM, *Thunberg.* W.A., between Red Hill and Yilgarn.

POLYGALEÆ.

COMESPERMA SCOPARIUM, *Steetz.* W.A., Warangering.

COMESPERMA INTEGERRIMUM, *Endl.* W.A., Quardanoolagin near Yilgarn.

TREMANDREÆ.

TETRATHECA EFOLIATA, *F. v. M.* W.A., near Warangering.

RUTACEÆ.

BORONIA CŒRULESCENS, *F. v. M.* W.A., Victoria Desert (C. 54); between Red Hill and Yilgarn.

Variety. Branches very slender, branchlets subspinescent, and with very small and few leaves. W.A., near Warangering and 70 miles east of Mount Churchman.

ERIOSTEMON LINEARIS, *Cunningham.* S.A., Everard Range, at 3,000 feet, on granite.

ERIOSTEMON TUBERCULOSUS, *F. v. M.* W.A., near Victoria Spring (C. 59).

Leaves proportionately broader than usual. This is the true *Phebalium microphyllum* of Turczaninow, as is clear from the original description, but the specific name given by him was preoccupied in the genus Eriostemon for the *P. brachyphyllum* of Bentham, from near the Southern shores of St. Vincent's and Spencer's Gulf. The *Phebalium tuberculosum* of Bentham seems to have always the leaves longer and narrower, with their margin involute instead (as in the genuine *E. tuberculosus*) revolute. It is however sometimes difficult to perceive this, as a slight twist of the very short petiole would reverse the surface of the leaves. This particular plant, with almost terete and channelled leaves, was collected during Giles' third expedition towards Ularing. Drummond's specimen has some of the leaves fully one inch long. The species has now received the name *E. canaliculatus.* To this plant was referred in the Fragm. Phytogr. Austr. IX., 108, by a note under *E. filifolius.*

PHILOTHECA HASSELLI, *F. v. M.* W.A., Between Red Hill and Yilgarn.

GEIJERA PARVIFLORA, *Lindley.* W.A., near and at Fraser Range.

ZYGOPHYLLEÆ.

NITRARIA SCHŒBERI, *Linné.* S.A. Cootanoorina.

"A shrub 2 to 3 ft., fruit red."

ZYGOPHYLLUM APICULATUM, *F. v. M.* W.A., Victoria Desert (C. 59).

ZYGOPHYLLUM GLAUCESCENS, *F. v. M.*, small-flowered variety. S.A. Cootanoorina.

ZYGOPHYLLUM IODOCARPUM, *F. v. M.* S.A. Cootanoorina.

ZYGOPHYLLUM AMMOPHILUM, *F. v. M.* S.A., Camp 22.

ZYGOPHYLLUM FRUTICULOSUM, *De Candolle.* W.A., a small-flowered variety, with some fruits ripening, only one seed; Victoria Desert (C. 54).

Var. AURANTIACUM, *F. v. M.* S.A., Warrina.

TRIBULUS TERRESTRIS, *Linné.* S.A., Warrina (C. 11); W.A., near Mount Squires.

TRIBULUS HYSTRIX, *R. Brown.* S.A., Warrina.

If *T. occidentalis*, R. Brown, can be upheld as a distinct species, then the Warrina specimens belong to it—having the large petals (one inch or more long), numerous leaflets (9 to 12) and subulate spines on the fruit, which are attributed as distinctive characters by Mr. Bailey. But a re-examination of copious material confirms the decision arrived at, and promulgated by one of us (F. v. M.) in the Essay on the Babbage-plants, and subsequently adopted by Bentham, that *T. occidentalis* has no claim to specific rank; an analagous case is with *T. cistoides*, which represents a large-flowering state of *T. terrestris*.

The following localities of *T. hystrix*, as represented by authentic specimens in our herbaria, serve to define the geographic distribution of this characteristic Eremian plant:—

N.W.A., Yule Gorge, Pyramid and Sherlock Rivers (Hon. Sir J. Forrest); Roebuck Bay (A. Forrest); Dampier Archipelago (Walcott, Hughan); Port Walcott (Harper) and interior from Nichol Bay (F. Gregory); Fortescue River (Carey, also J. Forrest); Gascoyne River (Bunbury, Survey Exped., also J. Forrest); Menilyalka River (J. Forrest). C.A., Barrow Creek (Chandler); MacDonnell Range (Flierl); Rawlinson Range (E. Giles); Lake Amadeus (E. Giles); Finke River (R. E. Warburton, McDougall Stuart); Eyre's Creek (Kayser); Cooper-Creek (Howitt, also McLeod); Stevenson Creek and Charlotte-Waters (Dittrich); towards Spencer-Gulf (Warburton); Strangway-Spring (Dr. Cleland).

TRIBULUS MACROCARPUS, *F. v. M.* W.A., near Mount Squires.

TRIBULUS PLATYPTERUS, *Bentham.* W.A.; lat. 26° 49′, long. 123° 30′ (D. Cumming).

GERANIACEAE.

ERODIUM CYGNORUM, *Nees.* S.A., Cootanoorina, Arkaringa Valley; also at these localities a variety with pinkish flowers and slightly lobed leaves; Everard Range. W.A., Fraser Range.

OXALIS CORNICULATA, *Linné.* S.A., Arkaringa Valley; W.A., Fraser Range; native name, "*mulda mulda.*"

MALVACEÆ.

LAVATERA PLEBEIA, *Sims.* W.A., Victoria Spring, Fraser Range.

MALVASTRUM SPICATUM, *A. Gray.* S.A., Arkaringa Valley, Mount Watson.

PLAGIANTHUS DIFFUSUS, *Bentham.* W.A., near Hunt's Well, Hampton Plains. Leaves seemingly never much cuneated, in the

present specimens blunt or rounded or even cordate at the base; the crenulation often extending all round. The *P. densiflorus* (Edm. Baker, in Britten's Journ. of Bot., XXX., 72) is more closely related to *P. glomeratus*. Mr. Isaac Tyson found it also on the Upper Murchison River. Calyx-lobes shorter than the tube. Petals almost scarious. Anthers at first pure white, finally yellowish. A more glabrous form was collected by F. v. M. at Hamelin Harbor.

PLAGIANTHUS BERTHÆ, *F. v. M.* Near Fraser Range (C. 68), only the pistillate plant. A fragment of this species occurred in James Drummond's collection. It is now also known from Parker Range (Merrall), Katanning (Mrs. M. Heal), towards Lake Lefroy (Cronin). In South Australia this plant is usually more glabrous, and its flower-stalklets are more elongated.

PLAGIANTHUS HELMSII, *spec. nov.* W.A., Lake Lefroy; Murchison district; native name, "*dunna-dunna.*" Also Lake Annean (Mr. S. Dixon, 10/'93).

Stem robust, branchless or few-branched, all over closely beset with fascicles of minute, mostly oval lanceolar, pale-lepidote, somewhat canaliculate leaves; stipules conspicuous, truncate or outward acuminate, ciliolate, adnate to the broad petioles; flowers very small, each solitary, sessile within a leaf-fascicle; calyx lepidote, almost semiellipsoid, but its lobes extremely short; petals delicately membranous, glabrous, extensively transparent, almost colorless or brownish towards the summit, less than half-exserted; staminal column very short, anthers whitish, not numerous (pistillate flowers and their fruits unknown).

This shares with *P. microphyllus* in the characteristics of leaves and flowers, but with *P. spicatus* in the simple manner of growth. The leaves are quite entire, often folded from the sides inward, and sometimes arched-curved.

SIDA CORRUGATA, *Lindley.* W.A., Mount Squires, Fraser Range. Var. PEDUNCULATA, S.A., Arcoeillina Well.

SIDA INTRICATA, *F. v. M.* S.A., Nilpena.

SIDA VIRGATA, *Hooker.* S.A., between Nilpena and Cootanoorina.

SIDA CALYXHYMENIA, *J. Gay.* S.A., Arcoeillina Well; W.A., Camp 61, Fraser Range; lat., 27° 3′, long., 124° 6′ (*D. Cumming*).

SIDA PETROPHILA, *F. v. M.* S.A., Upper Arkaringa Valley; West from Wawee waterhole; Everard Range at 3,000 feet; Peculiar Hill (C. 15).

ABUTILON TUBULOSUM, *Hooker.* S.A., Warrina; near Turner Hill (C. 10); Peculiar Hill (C. 15).

ABUTILON CRYPTOPETALUM, *F. v. M.*, variety with large white petals. W.A., Victoria Desert (C. 53).

Abutilon oxycarpum, *F. v. M.* S.A., Arkaringa Creek. W.A., Fraser Range.

Abutilon Fraseri, *Hooker.* W.A., near Mount Squires.

Abutilon halophilum, *F. v. M.* S.A., Warrina; Arkaringa Valley.

Hibiscus Pinonianus, *Gaud.* S.A., Everard Range (leaves narrow-oblong, with or without basal lobes); Mount Goolwa (C. 6); Coffin Hill; Pingegurrina Hill; Birksgate Range (leaves orbicular, without lobes). W.A., Near Mount Squires; Victoria Desert (C. 53); 30 and 60 miles N.W. from Fraser Range.

Hibiscus brachysiphonius, *F. v. M.* S.A., Warrina.

Hibiscus Krichauffii, *F. v. M.* S.A., Warrina.

Hibiscus Farragei, *F. v. M.* W.A., Fraser Range.

Hibiscus Sturtii, *Hooker.* S.A., between Arcoeillina and Wawee Waterhole; eastern edge of Everard Range.

Hibiscus hakeaefolius, *Giordano.* W.A., Fraser Range; about 36 miles N.W. of Southern Cross; 100 miles N.E. of Geraldton. "The flowers never open properly, and they seem to be fertilised by ants, which infest them in great numbers. The scent of the flowers is very pleasant, though faint, and resembles that of the tulip."

Gossypium Sturtii, *F. v. M.* S.A., Everard Range; near Mount Watson; Mount Sir Thomas; C. 22.

STERCULIACEÆ.

Brachychiton Gregorii, *F. v. M.* S.A., about 25 miles N.W. of Camp 9; a tree 40 feet high. W.A., near Skirmish Hill (Camps 26, 28), Victoria Desert (C. 49, C. 50, C. 62), 75 miles N.W. of Fraser Range, as a stunted tree; between Red Hill and Yilgarn. With the normal fruits collected at various places in the Victoria Desert are others nearly two inches long and much pointed, possibly indicating another species. "The inner bark of the stem and the bark of the roots are extensively chewed by the natives of Victoria Desert. There are thin layers of a glutinous substance between the layers of bark, with a taste like that of cocoa-nut. The seeds are roasted and eaten by the natives.

Commerconia cinerea, *Steudel.* W.A., near Yilgarn.

Commerconia Kempeana, *F. v. M.* W.A., Victoria Desert (C. 40, C. 44), a shrub of one foot high.

Commerconia magniflora, *F. v. M.* In a varietal form with more acute calyx-lobes; moreover, the color of the calyx is reddish. S.A., near Mount-Ibillie soakage, a shrub from four to eight feet high; Everard Range, at from 2,000 to 3,000 feet elevation; Birksgate Range.

Commerconia rotundifolia, *F. v. M.* A form with more oval leaves than the typical plant. W.A., near Lake Deborah,

a shrub from two to five feet high; about 36 miles N.W. of Southern Cross.

COMMERCONIA MELANOPETALA, *F. v. M.* W.A., Victoria Desert (C. 54).

COMMERCONIA CRAUROPHYLLA, *F. v. M.* W.A., Victoria Desert (C. 54, C. 56, C. 61), near Fraser Range.

This species was originally described from specimens with only young flowers.

HANNAFORDIA BISSILLI, *F. v. M.* W.A., between Red Hill and Yilgarn.

SERINGEA INTEGRIFOLIA, *F. v. M.* W.A., Victoria Desert (C. 44, C. 45, C. 54, C. 57, C. 59), a shrub from one to three feet high; near Lake Deborah, on granite rocks, to about five feet high; lat. 26° 30′, long. 120° 52′ (D. Cumming).

EUPHORBIACEÆ.

CALYCOPEPLUS HELMSII, *spec. nov.* W.A., 36 miles N.W from Southern Cross. A shrub, branching from near the base to from 5 to 12 feet high; the stems have a diameter of from 1½ to 4 inches, the bark is longitudinally wrinkled; the young branches of one inch diameter have a grey, slightly and flatly longitudinally ridged bark. For description see Appendix.

EUPHORBIA ERYTHRANTHA, *F. v. M.* W.A., near Mount Squires; Victoria Desert (C. 53).

EUPHORBIA DRUMMONDII, *Boissier.* S.A., Nilpena; Cootanoorina. W.A., Victoria Desert; near Yilgarn.

EUPHORBIA EREMOPHILA, *Cunningham.* S.A., Cootanoorina; Arkaringa Valley. W.A., near Mount Squires; Victoria Desert (C. 53, C. 54).

PORANTHERA MICROPHYLLA, *Brong.* W.A., Karolin; Victoria Desert (C. 53).

MONOTAXIS GRANDIFLORA, *Endlicher*, var. OBTUSIFOLIA. W.A., Gnarlbine and Warangering. The only differences from the legitimate plant seem shortness and bluntness of the leaves, and although the calyx-lobes are less acute, this character is shown to be variable in Drummond's and Preiss's plants. The rudimentary pistil in the staminate flowers has been recorded by Nees.

MONOTAXIS LUTEIFOLIA, *F. v. M.* S.A., Yeelunginna Hill (C. 4), on granite. W.A., near Gnarlbine and Victoria Desert (C. 54).

MONOTAXIS GRACILIS, *Baillon.* W.A., near Gnarlbine.

BEYERIA VISCOSA, *Miquel.* W.A., *Var. angustifolia*, Fraser Range. "A shrub two to four feet high. By the natives of the Hampton Plain called *warril;* by those of the Fraser Range, *barru.*"

BEYERIA BREVIFOLIA, *Baillon.* W.A., near Lake Lefroy. "A shrub from three to five feet high."

RICINOCARPUS VELUTINUS, *F. v. M.* W.A., Lake Deborah, a hrub three to five feet high; 30 miles N.W. from Southern Cross; 100 miles N.E. from Geraldton. The petals of the staminate flowers are somewhat longer than the calyx and more glabrous.

BERTYA DIMEROSTIGMA, *F. v. M.* W.A., Victoria Desert (C. 54, C. 59).

PHYLLANTHUS THESIOIDES, *Bentham.* S.A., Arcoeillina Well.

PHYLLANTHUS LACUNARIUS, *F. v. M.* W.A., near Mount Squires.

ADRIANA TOMENTOSA, *Gaudichaud.* W.A., Victoria Desert (C. 54), two feet high.

ADRIANA QUADRIPARTITA, *Gaudichaud.* S.A., Arkaringa Creek.

URTICACEÆ.

FICUS PLATYPODA, *Cunningham.* S.A., Arcoeillina, Upper Arkaringa Valley, Birksgate Range.

PARIETARIA DEBILIS, *G. Forster.* S.A., near Everard Range; W.A., near Mount Squires.

CASUARINEÆ.

CASUARINA CORNICULATA, *F. v. M.* W.A., near Boorabin, four to eight feet high.

CASUARINA GLAUCA, *Sieber.* S.A., Everard Range, five to twelve feet; near Ferdinand River, 30 feet. W.A., Victoria Desert (C. 53, 54), 25 to 30 feet.

These specimens include the ordinary desert form, and one with more slender branchlets.

CASUARINA HUMILIS, *Otto & Dietrich.* S.A., Everard Range; W.A., Victoria Desert (C. 56, two to five feet), near Fraser Range, near Gnarlbine (five to eight feet). Rudimentary leaves deltoid, not rarely six in a whorl (as stated by Miquel); strobile slightly sericeous.

Var.? S.A., Moolalpinna Hill (C. 7). Has the foliage almost of *C. humilis*, but the whorls are mostly seven-denticulate, and the spikes rather long and quite slender; fruits unknown.

CASUARINA ACUTIVALVIS, *F. v. M.* W.A., Victoria Spring, 12 to 15 feet. Fruit-valves slightly carinate, they might be considered rather sepaline than bracteolar in some analogy with the staminate flowers, the envelope of which is considered bisepalous. The seed-like fruit of this species, inclusive of its terminating appendage, attains a length of rather more than half-an-inch, but it is narrow in proportion to its width.

CASUARINA BICUSPIDATA, *Bentham.* W.A., near Victoria Spring. Appendage of each fruit-valve long-exserted, subulate, slightly curved. Seed-like fruits, brownish-black outside. In the collection the strobiles of *C. bicuspidata* are mixed with

others in which the fruit-valves are devoid of appendages, unless this should prove a variable characteristic ; therefore, the accompanying flowering specimen may belong to another congener. The remarkable organisation of the anthers for fecundation, recently discovered by Dr. Treub, has subsequently also been discovered in some Amentaceæ ; hence on that account the Casuarineæ need not be kept far distant from the Amentaceous order. Moreover, as regards foliage, we have in *Exocarpos* similar extreme diminution of the foliaceous organs along with the development of large leaves in *E. latifolia.* Furthermore, leaves as minute as in some cupressinous genera occur also in *Choretrum, Leptomeria, Tamarix, Calycothrix, Melaleuca, Styphelia* and many other genera with highly developed floral structure, though not connately decurrent.

SAPINDACEÆ.

Dodonæa viscosa, *Linné.* S.A., Arcoeillina, eastern edge of Everard Range, Everard Range ; W.A., Barrow Range.

Var. attenuata. W.A., Hunt's Well, Hampton Plains.

Dodonæa lanceolata, *F. v. M.* S.A., eastern edge of Everard Range ; W.A., Yenumba.

Dodonæa filifolia, *Hooker.* W.A., Victoria Desert (C. 40), "a shrub from three to four feet high." Known also from the Upper Murchison River (Weston).

Dodonæa lobulata, *F. v. M.* W.A., Victoria Desert (40 and 60 miles south of Victoria Spring) ; lat., 27° 53′, long., 123° 45′ (D. Cumming).

Dodonæa hexandra, *F. v. M.* W.A., 85 miles N.E. by E. from Esperance Bay (P. A. Gwynne).

Dodonæa microzyga, *F. v. M.* S.A., Arkaringa Valley, Camp 4, and forty miles south of Camp 4.

Variety. W.A., Fraser Range, native name, *marganyindi.*

Dodonæa stenozyga, *F. v. M.* W.A., Victoria Desert (40 and 60 miles South of Victoria Spring) ; near Fraser Range.

FRANKENIACEÆ.

Frankenia lævis, *Linné.* S.A., Cootanoorina ; near Ferdinand River. W.A., 56 miles N.W. of Fraser Range ; near Hunt's Well, Hampton Plains. Collected in various varieties.

Frankenia tetrapetala, *Labill.* W.A., Camp 64 ; Southern Cross.

PORTULACEÆ.

Portulaca oleracea, *Linné.* W.A., near Mount Squires.

Claytonia polyandra, *F. v. M.*, var. monantha. W.A., Victoria Desert (C. 49).

Claytonia Balonnensis, *F. v. M.* W.A., Victoria Desert (C. 51); Victoria Spring; capsule oval, hardly half-exsert.

Claytonia volubilis, *F. v. M.* W.A., Victoria Desert (C. 51), with petals longer than usual.

Claytonia ptychosperma, *F. v. M.* W.A., near Mount Squires; a rather large form, with broader leaves and proportionately shorter peduncles.

CARYOPHYLLEÆ.

Saponaria tubulosa, *F. v. M.* W.A., Fraser Range.

Spergularia rubra, *Cambessedes.* W.A., Victoria Spring.

Polycarpæa Indica, *Lamarck.* W.A., near Mount Squires; a form with leafy inflorescence.

AMARANTACEÆ.

Alternanthera triandra, *Lamarck.* S.A., Arcoeillina Well.

Ptilotus latifolius, *R. Brown.* W.A., near Boundary Hill.

Ptilotus obovatus, *F. v. M.* "Met with everywhere, and in all kinds of soil and situation." S.A., Arkaringa; Eastern edge of Everard Range; native name, *purarpurar.* W.A., near Mount Squires, Victoria Desert (C. 48), Fraser Range.

Ptilotus incanus, *Poiret.* S.A., Warrina and Cootanoorina.

Ptilotus alopecuroideus, *F. v. M.* S.A., Cootanoorina and Arkaringa Creeks, near Camps 20 and 21, near Ferdinand River; W.A., Mount Squires; Victoria Desert (C. 51, C. 53).

Ptilotus hemisteirus, *F. v. M.* S.A., Everard Range; W.A. Victoria Desert (C. 53); Fraser Range.

Ptilotus exaltatus, *Nees.* S.A., Arkaringa Valley; W.A., near Mount Squires; Victoria Desert (C. 53, C. 57, C. 58), near Southern Cross.

Ptilotus helipteroides, *F. v. M.* S.A., Arkaringa Valley, Everard Range, Camp 10; W.A., near Barrow Range, Mount Squires.

Ptilotus striatus, *F. v. M.* W.A., near Knutsford, between Red Hill and Yilgarn.

Ptilotus Drummondii, *F. v. M.* W.A., Victoria Desert (C. 53, C. 54, C. 58, C. 59), Fraser Range, Karolin.

Ptilotus spathulatus, *Poiret.* W.A., Fraser Range.

Ptilotus holosericeus, *F. v. M.* W.A., Victoria Desert (C. 61, C. 66).

Euxolus Mitchelli, *F. v. M.* S.A., between Everard and Birksgate Ranges; W.A., near Mount Squires.

SALSOLACEÆ.

Atriplex velutinellum, *F v. M.* S.A., Warrina.

Atriplex elachophyllum, *F. v. M.* S.A., near Birksgate Range, C. 22.

ATRIPLEX PROSTRATUM, *R. Brown.* W.A., near Mount Squires.

ATRIPLEX QUINII, *F. v. M.* A broad-leaved variety. S.A., Arkaringa Creek.

ATRIPLEX STIPITATUM, *Bentham.* S.A., Warrina; W.A., near Townsend Ridge (C. 38), Victoria Desert (C. 61, C. 64, C. 67), Fraser Range, Lake Lefroy.

ATRIPLEX NUMMULARIUM, *Lindley.* Camp 64, forty miles N.W. from Fraser Range; "called *malloiyi* by natives of Hampton Plain.

ATRIPLEX HALIMOIDES, *Lindley*, var. CONDUPLICATA. S.A., Cootanoorina.

ATRIPLEX SPONGIOSUM, *F. v. M.* S.A., Warrina; Arkaringa Creek.

RHAGODIA CRASSIFOLIA, *R. Brown.* W.A., Victoria Spring; Fraser Range; between Red Kangaroo Hill and Yilgarn.

RHAGODIA SPINESCENS, *R. Brown.* S.A., between Warrina and Nilpena; Upper Arkaringa Valley. W.A., Victoria Spring; Camp 64; Fraser Range *(wandundant).*

RHAGODIA NUTANS, *R. Brown.* S.A., Cootanoorina.

CHENOPODIUM NITRARIACEUM, *F. v. M.* W.A., lat. 26° 42′, long. 122° 58′; (foliage only, D. Cumming).

CHENOPODIUM CARINATUM, *R. Brown.* S.A., Everard Range. W.A., near Mount Squires; Victoria Desert (C. 53).

CHENOPODIUM RHADINOSTACYHUM, *F. v. M.* S.A., near Camp 23. W.A., near Mount Squires; Victoria Desert (C. 53). Var. PANICULATUM. W.A., Victoria Desert (C. 53).

DYSPHANIA LITORALIS, *R. Brown.* S.A., Camp 4; W.A., near Mount Squires.

KOCHIA LOBIFLORA, *F. v. M.* S.A., Cootanoorina Creek; Arkaringa Valley; Upper Arkaringa Valley; Everard Range (C. 2).

KOCHIA LANOSA, *Lindley.* S.A., Nilpena; Turner Hill (C. 9). W.A., Camp 63.

KOCHIA TRIPTERA, *Bentham*, var. ERIOCLADA. W.A., Lake Lefroy.

KOCHIA VILLOSA, *Lindley.* W.A., 20 miles South of Victoria Spring (C. 61); lat. 26° 30′, long. 120° 52′ (D. Cumming).

Var. S.A., Warrina; near Arcoeillina.

KOCHIA APHYLLA, *R. Brown.* S.A., Cootanoorina Creek. Var. Warrina.

KOCHIA SEDIFOLIA, *F. v. M.* S.A., Cootanoorina. W.A., Victoria Spring; Fraser Range, "native name *buddani.*"

KOCHIA CILIATA, *F. v. M.* S.A., Cootanoorina Creek.

KOCHIA ERIANTHA, *F. v. M.* S.A., Arkaringa Creek.

KOCHIA GLOMERIFOLIA, *n. sp.* W.A., North of Fraser Range; also near Victoria Spring (Giles), and on the Upper Murchison River (Tyson).

Shrubby; branches very spreading, densely beset with very small glomerules of leaves, always tomentellous, sometimes getting spinescent; leaves very minute, closely crowded in each glomerule, from lanceolar verging into an ovate or rhomboid form, concave, partially lanuginous, some shortly petiolate; flowering calyx whitish-velutinous, its lobes inflexed-appressed, but soon erect and irregularly elongating into somewhat spathular crisped membranous appendages; stigmas two; fruiting calyx almost flat below and there radiatingly ten-streaked, slightly elevated above, horizontally expanding into a lobeless or slightly interrupted broadish membrane; fruit depressed, outside brownish; albumen of the seed scanty.

Attains a height of two feet. A remarkable plant, the fruit of which now only known through Mr. Tyson's collection.

Although systematically allied to *K. aphylla*, it is by the innumerable, mostly globular, clusters of leaves, so different in aspect from any other *Kochia*, as to appear quite strange in that genus; indeed, seen in foliage only, the plant rather reminds of *Aster lepidophyllus*, so far as Australian forms of vegetation are concerned.

Babbagia dipterocarpa, *F. v. M.* S.A., Cootanoorina.

Bassia carnosa, *F. v. M.* W.A., Victoria Desert (C. 63).

Bassia eurotioides, *F. v. M.* W.A., near Hunt's Well, Hampton Plain.

Bassia sclerolænoides, *F. v. M.* W.A., Victoria Desert (C. 53, C. 55, C. 56); Camp 66.

Bassia Birchii, *F. v. M.* A remarkably dwarf form, although copiously fruiting. S.A., between Everard and Birksgate Ranges.

Bassia uniflora, *F. v. M.* W.A., Victoria Desert (C. 53).

Bassia diacantha, *F. v. M.* S.A., Upper Arkaringa Valley; W.A., Victoria Spring, Fraser Range.

Bassia lanicuspis, *F. v. M.* S.A., Arkaringa Creek.

Bassia bicornis, *F. v. M.* S.A., Warrina.

Bassia paradoxa, *F. v. M.* S.A., Arkaringa Valley.

Bassia bicuspis, *F. v. M.* S.A., Upper Arkaringa Valley.

Bassia echinopsila, *F. v. M.* W.A., Victoria Desert (C. 54).

Enchylæna tomentosa, *R. Brown.* S.A., Cootanoorina; eastern edge of Everard Range.

Salicornia arbuscula, *R. Brown.* S.A., Cootanoorina.

Salicornia leiostachya, *Bentham.* S.A., Cootanoorina.

Salicornia bidens, *Bentham.* W.A., Lake Lefroy.

Salicornia tenuis, *Bentham.* S.A., Nilpena.

Salsola Kali, *Linné.* S.A., Warrina, Cootanoorina; W.A., Camp 26, Fraser Range.

Var. strobilifera. S.A., Warrina.

FICOIDEÆ.

TETRAGONIA EXPANSA, *Murray*. W.A., Fraser Range.
AIZOON QUADRIFIDUM, *F. v. M.* W.A., near Knutsford.
ZALEYA DECANDRA, *Burmann*. S.A., Warrina.
TRIANTHEMA CRYSTALLINA, *Vahl*. W.A., near Mount Squires.

POLYGONACÆ.

MUEHLENBECKIA ADPRESSA, *Meissner*. W.A., Warangering.
MUEHLENBECKIA POLYGONOIDES, *F. v. M.* W.A., near Fraser Range, C. 68.
MUEHLENBECKIA CUNNINGHAMII, *F. v. M.* S.A., Cootanoorina; W.A., Fraser Range.

PHYTOLACCEÆ.

GYROSTEMON RAMULOSUS, *Desfont.* S.A.; W.A., Arkaringa Creek and other wet places as far as Barrow Range; locally known as "native pepper."
CODONOCARPUS COTINIFOLIUS, *F. v. M.* Native poplar, "a tree 12 to 15 feet high." S.A., Arkaringa Valley, and sparingly to W.A., Mount Squires and Victoria Desert (C. 56).

NYCTAGINEÆ.

BOERHAAVIA DIFFUSA, *Linné*. W.A., near Mount Squires; lat. 27° 5′, long. 119° 15′ (D. Cumming).

THYMELEÆ,

PIMELEA ANGUSTIFOLIA, *R. Brown*. W.A., Victoria Desert (C. 56, C. 57), near Warangering.
PIMELEA NERVOSA, *Meissner*. W.A., 85 miles N.E. by E. from Esperance Bay (P. A. Gwynne).
PIMELEA FERRUGINEA, *Labil*. W.A., 85 miles N.E. by E. from Esperance Bay (P. A. Gwynne).
PIMELEA TRICHOSTACHYA, *Lindley*. S.A., Arkaringa Creek; W.A., near Barrow Range, Victoria Desert (C. 53, C. 54).
PIMELEA MICROCEPHALA, *R. Brown*. S.A., Warrina, Nilpena, Upper Arkaringa Valley; W.A., Fraser Range; lat. 26° 39′, long. 120° 34′ (D. Cumming).
Var. GLABRA. S.A., Cootanoorina Creek, eastern edge of Everard Range, near Mount Illbillie Soakage at 2,000 feet, Birksgate Range; W.A., Victoria Desert (C. 54).
PIMELEA VILLIFERA, *Meissner*. W.A., between Red Hill and Yilgarn.

LEGUMINOSÆ.

BRACHYSEMA CHAMBERSII, *F. v. M.* WA., 28 miles S.W. of Camp 31, near Barrow Range.

Brachysema aphyllum, *Hooker.* W.A., 35 miles N.W. from Fraser Range, three to six feet high, without flowers.

Oxylobium obtusifolium, *Sweet.* W.A., 85 miles N.E. by E. from Esperance Bay (P. A. Gwynne). Ovules numerous.

Gastrolobium grandiflorum, *F. v. M.* W.A., Victoria Desert, C. 53. A shrub three to four feet high. Probably represents the small-flowered state of this species; fruits not collected.

Gastrolobium trilobum, *Bentham.* "Kite-leaf poison plant." W.A., near Brood's Station.

Gastrolobium spinosum, *Bentham.* W.A., Victoria Desert, C. 56. "Poisonous to camels."

Gastrolobium bilobum, *R. Brown.* "Heart-leaf poison-plant." W.A., Mount Ridley, 3 to 5 feet; near Esperance Bay (D. Lindsay).

Gastrolobium scorsifolium, *F. v. M.* W.A., Victoria Desert (C. 54); near Gnarlbine; about 15 miles W. of Red Hill.

Isotropis juncea, *Turcz.* W.A., 36 miles N.W. from Southern Cross; near Lake Deborah. Fruit imperfectly sericeous, when ripe about one inch long to one sixth inch broad, conspicuously compressed, short stipitate; seeds ripening to five, oblique, roundish renate, about one-tenth inch long.

Isotropis canescens, *F. v. M.* W.A., Victoria Desert (C. 54) Petals purplish, the upper and lateral conspicuously dark-streaked, the two lower quite dark-colored.

Mirbelia microphylla, *Bentham.* W.A., 36 miles N.W. from Southern Cross.

Mirbelia aphylla, *F. v. M.* W.A., near Mount Churchman (C. 94). Externally this plant is much like *Jacksonia stricta*, which species received its name probably through a typographical error, as the ramification is the reverse of strict; the name intended by Meissner was evidently *J. striata*, on account of the streaks on the branches; the phyllode- or spinule-like ultimate branchlets are compressed and mostly quadrangular, in which respect this Jacksonia is also very similar to *Mirbelia aphylla.*

Burtonia gompholoides, *F. v. M.* W.A., Victoria Desert (C. 56) [Yerdanie and Warangering]. Fruiting at a height of nine inches. Leaflets conspicuously margined. Ripe fruit quite turgid.

Burtonia simplicifolia, *spec. nov.* W.A., Victoria Desert at Camp 54. Densely beset with minute grey spreading hairlets; leaves crowded, very small, simple, sessile, elliptic- or broad-linear bluntish, revolute at the margin; flowers small, sessile between the uppermost leaves, crowded into headlets few in each; calyx deeply cleft into almost equal lanceolar lobes; petals deep-yellow: anthers roundish-cordate, pale; style upwards glabrous; ovulary densely beset with hairlets.

Branchlets copious, spreading, or at first curved downward. Leaves one-sixth to one-quarter inch long. Bracts almost leaf-like; bracteoles short. Calyx measuring only one-quarter of an inch in length, before expansion somewhat pyramidal and prominently angled. Petals not much extended beyond the calyx, the upper orbicular, slightly lobed at both extremities. Style when young strongly incurved. Ovules two. Fruit unobtained.

The only other *Burtonia* with simple leaves, namely *B. conferta*, is very different, already in want of indument, less ramification, longer leaves, larger flowers on well-developed stalklets, color of petals, form of anthers and most likely also in fruit-characteristics. In general aspect, as well as smallness of leaves and flowers, our new species approaches *B. gompholobioides*, but that plant is otherwise widely distinct.

JACKSONIA FOLIOSA, *Turcz.* W.A., Victoria Desert (C. 48, C. 54, C. 58); near Knutsford. A plant collected at Camp 58 seems a more ramulose variety of this species; but as yet no fruits are known from any of the localities.

JACKSONIA NEMATOCLADA, *F. v. M.* W.A., near Gnarlbine.

Professor Greene has recently proposed, that the Australian genus *Jacksonia* should be superseded by *Piptomeris*, because Rafinesque utilised some few years before R. Brown the name Jacksonia, giving it generically to a species of *Cleome*, which appellation, however, he subsequently changed to *Polanisia*. But that genus became suppressed for Australia many years ago, and subsequently for Africa by Prof. Oliver. As the one American species, on which *Polanisia* was founded, differs only in trifling respects from other Cleomes, it seems best to restore it (perhaps sectionally) to its original systematic position.

DAVIESIA BREVIFOLIA, *Lindley.* W.A., near Gnarlbine; Victoria Desert (C. 54).

DAVIESIA PACHYLINA, *Turcz.* W.A., Fraser Range (1 ft.); Warangering, a glabrous state with much longer leaves. The acuminate long calyx-lobes are characteristic for this species; the form now mentioned reminds, as regards leaves, much of *D. longifolia*, in which species sometimes also acuminate leaves occur; if specific differences should exist between the two, then ripe fruits (unavailable here) must show this. The long-lobed calyx separates this plant from *D. polyphylla*.

DAVIESIA APHYLLA, *F. v. M.* Young fruit flat, semiorbicular-deltoid, on a very short stipe. W.A., Victoria Desert (C. 56); near Fraser Range (C. 68); 20 miles N.W. from Fraser Range, *mori* of the natives of Hampton Plain.

DAVIESIA ACANTHOCLONA, *F. v. M.* W.A., Victoria Desert (C. 54) and near Gnarlbine. Fruit (hitherto unknown) only about one-third of an inch long and broad, rhomboid-orbicular,

but slightly inequilateral, considerably compressed, short-acuminate, the stipes shorter than the calyx; one seed ripening, roundish, moderately compressed, greyish-brown, hardly one-twelfth of an inch long, about twice as long as its narrow slender strophiole.

AOTUS PASSERINOIDES, *Meissner*. W.A., near Warangering.

AOTUS TIETKENSII, *F. v. M.* W.A., Victoria Desert (C. 57).

PHYLLOTA LUEHMANNI, *F. v. M.* W.A., Victoria Desert, C. 58.

TEMPLETONIA EGENA, *Bentham*. W.A., Victoria Desert, C. 48, two to three and a-half feet, C. 54.

TEMPLETONIA SULCATA, *Bentham*. W.A., 30 miles N.W. from Southern Cross, five feet high.

CROTALARIA CUNNINGHAMII, *R. Brown*. S.A., between Warrina and Nilpena, Upper Arkaringa Valley, near Blyth Hill; W.A., near Barrow Range, three to four feet.

CROTALARIA DISSITIFLORA, *Bentham* S.A., Warrina.

PSORALEA ERIANTHA, *Bentham*. W.A., near Gnarlbine.

PSORALEA PATENS, *Lindley*. S.A., Birksgate Range.

INDIGOFERA BREVIDENS, *Bentham*. S.A., Cootanoorina and Everard Range; W.A., Barrow Range, about 20 miles west of Red Kangaroo Hill, Victoria Desert, C. 54; long. 122° 30′, lat. 27° 40′ (D. Cumming).

TEPHROSIA PURPUREA, *Persoon*. S.A., near Mount Watson, C. 17; W.A., Mount Squires.

PTYCHOSEMA TRIFOLIOLATUM, *F. v. M.* W.A., near Mount Squires.

CLIANTHUS DAMPIERI, *Cunningham*. W.A., Elder Creek, Warburton Range (Dr. Elliot).

SWAINSONIA COLUTOIDES, *F. v. M.* W.A., Victoria Desert, C. 54.

SWAINSONIA MICROPHYLLA, *A. Gray*. S.A., near Everard Range; W.A., near Barrow Range.

SWAINSONIA CAMPYLANTHA, *F. v. M.* S.A., Arkaringa Creek.

SWAINSONIA PHACOIDES, *Bentham*. S.A., Warrina, near Yeelunginna Hill, C. 4; W.A., Fraser Range.

SWAINSONIA STIPULARIS, *F. v. M.* S.A., near Mount Goolwa, C. 6; near Turner Hill, C. 10.

GLYCYRRHIZA PSORALEOIDES, *Bentham*. W.A., near Hunt's Well.

GLYCINE CLANDESTINA, *Wendland*. S.A., Birksgate Range; W.A., Fraser Range.

GLYCINE TABACINA, *Bentham*. S.A., Warrina.

KENNEDYA PROREPENS, *F. v. M.* W.A., near Barrow Range (C. 33) and Victoria Desert (C. 57). Flowers purple.

KENNEDYA PROSTRATA, *R. Brown*. W.A., between Red Hill and Yilgarn. The specimens are without flowers, but in fruit.

K. parviflora, which is in West Australia far more frequent, can in the fruiting state be best distinguished by the pod being very blunt at each end.

Cassia Sophera, *Linné*. S.A., near Mount Ibillee.

Cassia notabilis, *F. v. M.* W.A., near Mount Squires.

Cassia pleurocarpa, *F. v. M.* S.A., Birksgate Range. W.A., near Mount Squires; Victoria Desert (C. 49); between Red Hill and Yilgarn; 40 to 50 miles West of Knutsford; long. 122° 30′, lat. 27° 40′ (D. Cumming).

Cassia eremophila, *Cunn.* W.A., Fraser Range.

Cassia artemisioides, *Gaud.* S.A., Arkaringa Valley; W.A., Victoria Desert (C. 58).

Cassia Sturtii, *R. Brown.* S.A., Upper Arkaringa Valley.

Cassia desolata, *F. v. M.* S.A., Warrina; Arkaringa Valley. W.A., Barrow Range; Fraser Range.

Petalostylis labichoides, *R. Brown.* S.A., Everard Range. W.A., Cavenagh Range, at 2,000 feet; Warangering.

Labichea lanceolata, *Bentham.* W.A., Victoria Desert (C. 44).

Acacia patens, *Meissner.* S.A., Cootanoorina; 70 miles S.W. of Birksgate Range. W.A., Barrow Range.

Acacia tetragonophylla, *F. v. M.* S.A., Arkaringa; Everard Range.

Acacia restiacea, *Bentham.* W.A., 30 miles N.W. from Southern Cross.

Acacia triptycha, *F. v. M.* (?) W.A., Victoria Desert (Camps 56, 59, 61).

Acacia *aff.* gonophylla, *Bentham*, with long phyllodes. W.A., near Barrow Range.

Acacia extensa, *Lindley.* W.A., Victoria Desert (C. 42).

Acacia ulicina, *Meissner.* W.A., Victoria Desert (C. 56).

Var. oxyclada. W.A., Skirmish Hill.

Acacia erinacea, *Bentham.* W.A., Victoria Desert (C. 61) and Fraser Range.

Acacia acanthoclada, *F. v. M.* W.A., Victoria Desert (C. 54, 56).

Acacia lachnophylla, *F. v. M.* W.A., near Fraser Range.

Acacia Meissneri, *Lehmann.* W.A., Victoria Desert (C. 63), Fraser Range and N.W. of

Acacia sclerosperma, *F. v. M.* W.A., Mount Squires.

Acacia leiophylla, *Bentham.* W.A., Fraser Range, Hunt's Well.

Acacia notabilis, *F. v. M.* W.A., Cavenagh Range.

Var. S.A., near Boundary Hill; 25 to 30 feet.

Acacia salicina, *Lindley.* S.A., Cotanoorina; W.A., widely distributed throughout the Victoria Desert and generally affecting the crown of sand-ridges; Fraser Range.

ACACIA HOMALOPHYLLA, *Cunningham.* S.A., Warrina and Arkaringa.

ACACIA LEPTOPETALA, *Bentham.* W.A., 50 miles S.E. from Mount Churchman.

ACACIA SUBCOERULEA, *Lindley.* W.A., Fraser Range.

ACACIA STRONGYLOPHYLLA, *F. v. M.* S.A., Birksgate Range.

ACACIA *aff.* STRONGLOPHYLLA. W.A., Fraser Range.

ACACIA PYRIFOLIA, *DeCand.* W.A., Cavenagh Range.

ACACIA ESTROPHIOLATA, *F. v. M.* S.A., Arkaringa Valley.

ACACIA STENOPHYLLA, *Cunningham.* S.A., Cootanoorina and Arkaringa.

ACACIA SCLEROPHYLLA, *Lindley.* W.A., Victoria Desert (C. 37).

ACACIA DICTYOPHLEBA, *F. v. M.* S.A., Upper Arkaringa Valley, Birksgate Range.

ACACIA CYPEROPHYLLA, *F. v. M.* S.A., Warrina and Arkaringa Valley.

ACACIA ANEURA, *F. v. M.* S.A., Arkaringa Valley; W.A., long. 121° 30′, lat. 26° 30′ (D. Cumming).

ACACIA DORATOXYLON, *Cunn.* S.A., Mount Illbillee.

CRASSULACEÆ.

TILLÆA VERTICILLARIS, *DeCand.* S.A., Blyth Hills. W.A., Mount Squires, Victoria Spring, Fraser Range.

TILLÆA PEDICELLOSA, *F. v. M.* W.A., Warangering.

HALORAGEÆ.

HALORAGIS GOSSEI, *F. v. M.* S.A., between Camps 10 and 11. W.A., Mount Squires; Victoria Desert (C. 53, C. 54). Petals, 3; stamens, 6; stigmas, 3. Unrecorded localities are:—Nickol River (Hon. A. Forrest); Fortescue River and Exmouth Gulf (H. S. Carey); Ularing (J. Young); Upper Murchison (S. Dixon); Rawlinson Range (E. Giles).

HALORAGIS CONFERTIFOLIA, *F. v. M.* W.A., near Yilgarn.

HALORAGIS NODULOSA, *F. v. M.* W.A., Karolin.

LOUDONIA AUREA, *Lindley.* W.A., Victoria Desert (C. 54); near Fraser Range and towards Esperance Bay; near Gnarlbine.

STACKHOUSIEÆ.

STACKHOUSIA PUBESCENS, *A. Richard.* W.A., Fraser Range.

STACKHOUSIA HUEGELII, *Endlicher.* W.A., Lake Deborah; between Red Hill and Yilgarn.

STACKHOUSIA MURICATA, *Lindley.* S.A., Arkaringa Valley.

STACKHOUSIA VIMINEA, *Smith.* W.A., between Red Hill and Yilgarn.

STACKHOUSIA MEGALOPTERA, *F. v. M.* W.A., Barrow Range and Gnarlbine.

Stackhousia Brunonis, *Benthain.* W.A., Wangering (with four-winged fruits).

MYRTACEÆ.

Darwinia Luehmanni, *spec. nov.* Glabrous throughout; branchlets numerous, whitish; leaves short, crowded, linear-trigonous, bluntish; flowers crowded into small, almost hemispheric headlets; inner involucral bracts mostly ovate, membranous towards the margin; pedicels undeveloped; bracteoles nearly elliptic; lower part of the calyx transversely rugular and slightly squamulous-papillular, thence the calyx-tube much extended beyond the ovulary; calyx-lobes semi-orbicular; petals almost lanceolar, several times longer than the calyx-lobes; staminodes subulate-linear, towards the base broadish; stamens slightly surpassing the staminodes; style capillulary, near the stigma minutely barbellate; ovules two.

Eighty-five miles N.E. by E. from Esperance Bay (P. A. Gwynne).

Leaves generally about quarter-inch long. Headlets half to two-thirds inch broad. Inner bracts to half inch long, truncate at the base; bracteoles similar, exceeding somewhat the flowers. Calyx five-streaked. Petals white, about one-sixth inch long. Stamens nearly half as long as the petals; anthers quite dark, globular. Style measuring fully half-inch in length. Ripe fruit not obtained.

Nearest in affinity to *D. virescens*, which, however, is more decumbent, has the leaves darker green and more prominently dotted, larger flower-headlets, distinct pedicels, though short; calyx smoothish all over, its lobes almost semilanceolar (but originally described by Meissner as ovate), petals towards the base thicker, staminodia somewhat clavellate.

The species has been dedicated to Mr. G. Luehmann, Assistant at the phytologic establishment of Melbourne, who in the preliminary examination of the Helms-collection has on many occasions given valuable aid.

Darwinia diosmoides, *Bentham.* W.A., near Warangering, one to two feet; also Esperance Bay (Dempster), Israelite Bay (Miss Brooks).

Verticordia Brownii, *De Cand.* W.A., between Red Kangaroo Hill and Yilgarn.

Verticordia chrysantha, *Endl.* W.A., near Gnarlbine and Warangering; between Esperance Bay and Fraser Range (Gwynne).

Verticordia humilis, *Bentham.* W.A., 15 miles West of Red Kangaroo Hill; near Gnarlbine.

Verticordia multiflora, *Turcz.*, var. W.A., between Red Kangaroo Hill and Yilgarn.

VERTICORDIA INSIGNIS, *Endl.* W.A., between Fraser Range and Esperance Bay (P. A. Gwynne).

VERTICORDIA RENNIEANA, *sp. nov.* W.A., between Red Hill and Yilgarn.

Rather dwarf, glabrous except the flowers; leaves short, linear-semi-cylindric, slightly acute, dorsally beset with prominent oil-glandules; pedicels about as long as the leaves, shorter than the expanded flowers; bracteoles very broad, whitish, only short-apiculate; calyx-lobes three-seriate, the upper white except at the base, with moderately ciliar-pennate segments; calyx-lobes of the middle series minute, recurved, fascicular-fimbriate; those of the lowest row repressed, semiorbicular, much adnate, entire, hyaline, forming basal appendages to the upper lobes; calyx-tube short, glabrous, unfurrowed; petals pale, obovate, somewhat surpassing the upper calyx-lobes, entire; staminodes fringeless; fertile anthers cordate-ellipsoid, opening by rather long slits; style quite short, the summit papillular-fringed; stigma inconspicuous; ovulary depressed-globular, but attenuated into the style.

Height, so far as observable from the transmitted specimens, up to about one foot. Branchlets whitish. Leaves one-quarter to one-third of an inch long, erect or slightly spreading, more prominently glandular than those of most other congeners, reminding thus of those of several *Eriostemons*. Flowers rather small, some scattered, some in separate pairs, some racemosely approached among leaves. Petals about a quarter of an inch long. Ripe fruit not obtained.

This species is dedicated to the meritorious Professor of Chemistry in the Adelaide University, Dr. Rennie, who distinguished himself also by phyto-chemic analyses, and who has added here to the scientific obligations which we owe him by carrying on with particular effectiveness the secretarial duties at the recent Adelaide meeting of the Australian Association for the Advancement of Science.

This species differs from *V. picta* in smaller flowers, in the presence of refracted accessory undivided calyx-lobes.

It is distinguishable from *V. Drummondii* and *V. pennigera* by longer leaves, the presence of fringed accessory calyx-lobes, and by undivided not distinctly striate petals.

Incidentally it may here be observed that *V. Roei* constitutes a species distinct from *V. insignis;* it belongs more particularly to the upland region, from where, indeed, the Hon. Cant Roe brought also his plant, while *V. insignis* pertains to the litoral tracts; the staminodes are certainly fringeless, as Endlicher pointed out; the coloration of the flowers is sufficiently different to allow of distinguishing these two plants at a glance when once rightly understood.

We have *V. Roei* from beyond the sources of the Tone River (Muir), the Upper Gordon River (Mrs. Knight), the Upper Blackwood River (Webb), sources of the Pallinup River (Miss Cronin), Mount Caroline (Miss Sewell).

VERTICORDIA PICTA, *Endl.* W.A., near Gnarlbine; Red Kangaroo Hill.

CALYCOTHRIX TENUIRAMEA, *Turcz.* W.A., between Fraser Range and Esperance Bay (Gwynne). Leaves thicker than usual, bracteoles broader, petals more acute.

CALYCOTHRIX WATSONI, *n. sp.* W.A., 53 miles N.W. from Fraser Range.

Erect shrub, two to three feet high. Branchlets puberulous; leaves distinctly petiolate, very short, from ovate- to narrow-elliptic, flat or somewhat concave above, turgid beneath, soon glabrous; flowers rather small, nearly sessile, mostly scattered; bracteoles almost cuneate-ovate, apiculate, but otherwise very blunt, deeply disconnected, outside puberulous; calyx-tube soon longer than the bracteoles, rather turgid, near the summit attenuated, prominently five-streaked; calyx-lobes comparatively short, nearly lanceolate-linear, narrowed gradually and hardly setular upwards, about as long as the petals, outward as well as the tube much beset with hairlets; petals whitish, blunt; stamens numerous, their anthers ovate-ellipsoid, pale; style glabrous; fruit narrowly fusiform-ellipsoid.

This species differs from *C. plumulosa* in shorter, broader and more angular leaves, in smaller flowers, in neither long-setular nor towards the base suddenly dilated calyx-lobes, and in much less slender calyx-tube. From *C strigosa* it is distinguished at once by the broader leaves, the smallness of flowers, the almost truncate bracteoles, the much shorter and more turgid calyx-tube, the upwards broader calyx-lobes, the more obtuse petals, pale not bright-yellow filaments.

Our new plant shows also some affinity to *C. brachychaeta*, which, however, is a species confined to Arnhem's land.

Named in honor of Professor Archibald Watson, M.D., of the Adelaide University, who, amidst other researches, aided also the expedition, during which this evidently rare plant was discovered.

LHOTZKYA VIOLACEA, *Lindley*, var. MERRELLIANA, *nov.* W.A., between Red Hill and Yilgarn. Also sent by the late Mr. Merrell from near the eastern sources of Swan River. The leaves shorter, the flowers fewer, the petals pale. The typic form was brought by the Hon. W. M. Parker from the vicinity of Mount Stirling.

THRYPTOMENE STENOCALYX, *F. v. M.* W.A., Victoria Desert, C. 54.

THRYPTOMENE MAISONNEUVII, *F. v. M.* S.A., Cootanoorina,

Arcoeillinna, near Ferdinand River ("Desert ti-tree"); W.A., Victoria Desert, C. 45. Occurs also at the sources of the Ashburton River and beyond the Marie-Alfred Range (Giles).

THRYPTOMENE FLAVIFLORA, *F. v. M.* S.A., Cootanoorina; W.A., Victoria Desert, C. 54.

THRYPTOMENE HYMENONEMA, *F. v. M.* W.A., Victoria Desert, C. 57. Flowers pink.

THRYPTOMENE HELMSII, *F. v. M.* and *Tate.* W.A., Victoria Desert, C. 38, C. 39.

A shrub, three to five feet, almost glabrous; branchlets very slender; leaves closely approximated, obovate, and somewhat cuneate, slightly concave, but otherwise flat, pointless, quite entire, the conspicuous oleigerous glandules particularly visible beneath; flowers short-pedicellate; bracteoles soon much shorter than the flowers, cymbous-ovate, fugacious; calyx-tube turbinate-semiovate, ten-striate and five-plicate; calyx-lobes nearly thrice shorter than the petals, semiorbicular, entire or nearly so; petals almost orbicular, imperfectly denticulated; stamens about seven, much shorter than the petals; anthers roundish, dark-colored, opening by slits; filaments at least twice as long as the anthers; style much shorter than the stamens; stigma depressed; ovules several.

Differs from *T. saxicola* in shorter pedicels, in upwards less dilated calyx-tube, in denticulated petals, which reach further beyond the calyx-lobes, and in proportionately shorter stamens. It is separated from *T. Elliottii* by less thickness and more broadness of leaves, by much more disproportion between the length of the calyx-lobes and petals, and by not absolutely definite number of stamens.

THRYPTOMENE IMBRICATA, *F. v. M.* W.A., between Fraser Range and Esperance Bay (P. A. Gwynne).

THRYPTOMENE OBOVATA, *Turcz.* (syn., *T. Drummondi*). W.A., near Gnarlbine, two feet high, flowers white.

WEHLIA THRYPTOMENOIDES, *F. v. M.* Victoria Desert (C. 54, C. 56, C. 57) and near Warangering; flowers magenta.

Var. with narrower leaves; near Gnarlbine, three feet.

The same species was collected near Lake Brown by Mr. E. Merrall; beyond Youndegin, Mrs. Heal; near Lake Deborah, Hon. Sir John Forrest; eastern sources of Swan River, Miss G. Sewell. A variety with longer leaves, distinctly pedicellate flowers, and broader petals was gathered near Mount Moore by Messrs. King and Lefroy.

KUNZEA SERICEA, *Turcz.* W.A., about 20 miles W. from Red Hill; five feet, flowers red.

BALUSTION PULCHERRIMUM, *Hooker.* W.A., between Red Hill and Yilgarn.

LEPTOSPERMUM ROEI, *Bentham.* W.A., near Gnarlbine; three to five feet, with rather acute leaves.

MELALEUCA ELLIPTICA, *Labil.* W.A., Fraser Range; four feet.

MELALEUCA UNCINATA, *R. Brown.* W.A., Victoria Desert (C. 59, C. 63) and Warangering.

MELALEUCA PARVIFLORA, Lindley. W.A., Victoria Desert (C. 62), five to seven feet; Gnarlbine, the leaves with a more distinct furrow beneath.

MELALEUCA MACRONYCHIA, *Turcz.* W.A., about 36 miles N.W. from Southern Cross; four to five feet, a form with smaller leaves.

MELALEUCA CORDATA, *Turcz.* W.A., 45 miles N.W. from Mount Churchman; three feet.

Var. OVATA. This form indicates an approach to *M. pentagona.* Similar variability of leaves may be seen in *M. squarrosa* and some other species. W.A., on granite rocks west from Red Kangaroo Hill and at Warangering.

MELALEUCA GLOMERATA, *F. v. M.* At the boundary of S.A. and W.A.

MELALEUCA QUADRIFARIA, *F. v. M.* W.A., Fraser Range; 12 to 15 feet.

BEAUFORTIA INTERSTANS, *F. v. M.* W.A., between Red Hill and Yilgarn; also near Lake Deborah (Mr. Edwin Merrall).

Beaufortia elegans has been collected near Eucla by Mr. G. R. Turner, and seems to occur also at Eyre's Sandpatch, according to Mr. J. B. Batt's collection; this demonstrates for the first time the occurrence of the genus outside of West Australian territory.

B. macrostemon and *B. heterophylla* have been traced eastward as far as Coolgardie by Mr. Edw. Cronin.

B. Schaueri was gathered at Youndegin by Miss Alice Eaton, near Mount Caroline by Miss Geraldine Sewell, and between Mount Rugged and Victoria Spring by Mr. Brooke. It occurs rarely with whitish filaments.

B. squarrosa was brought by Miss A. Eaton from Youndegin.

CALOTHAMNUS BLEPHAROSPERMUS, *F. v. M.* W.A., 140 miles N.E. from Geraldton.

EUCALYPTUS UNCINATA, *Turcz.* W.A., Victoria Desert (C. 56), shrub, 12 feet; about 50 miles N.W. from Knutsford, 20 feet.

EUCALYPTUS PYRIFORMIS, *Turcz.* S.A., near Everard Range and sandhills towards Birksgate Range; W.A., sandhills S. of Victoria Spring.

EUCALYPTUS OLEOSA, *F. v. M.* S.A., between Everard and Birksgate Ranges (C. 9), 70 miles S.W. from Mount Watson; W.A., Victoria Desert (C. 56) and Depot Hill, 70 miles N.W. from Fraser Range.

EUCALYPTUS CÆSIA, *Bentham.* W.A., Victoria Desert (C. 63), 20 to 30 feet; 40 miles N.W. from Fraser Range; known also from Mount Stirling and about 50 miles east from York (Hon. W. M. Parker).

Some of the leaves verge into a lanceolar-ovate form. Flowers (hitherto undescribed) when expanding sometimes less than a quarter-inch long; calyces just before opening measuring in total length from two-thirds to one inch; tube turbinate-semiovate, often dilated near its edge, somewhat striate; operculum about as long as the tube, hemispheric, suddenly terminating into a conspicuous narrow conic protraction; stamens inflected while in bud, all fertile; filaments rigidulous, dull-yellowish when dried, some attaining a length rather above half an inch; anthers pale, cuneate-ellipsoid, broader towards the base, but pendent, bursting by longitudinal fissures; style prominent, but considerably shorter than the stamens; stigma hardly broader than the summit of the style.

The examination of the flowers now shows that this species should take its systematic place near *E. incrassata.*

EUCALYPTUS INCRASSATA, *Labil.* W.A., throughout the Victoria Desert, Fraser Range.

Var. DUMOSA. S.A., seventy miles S.W. of Pernamo Hill.

EUCALYPUS SALMONOPHLOIA, *F. v. M.* W.A., Victoria Desert (C. 63) and 40 miles N.E. of Fraser Range.

EUCALYPTUS OLDFIELDII, *F. v. M.* S.A., from Everard Range to near Birksgate Range (C. 4, C. 9, 10), 15 feet; W.A., Mount Cooper in Cavenagh Range, a dwarf state at 2,500 feet elevation.

EUCALYPTUS TERMINALIS, *F. v. M.* S.A., Mount Goolwa (C. 6), Everard Range and Wa-wee Rockhole; W.A., Cavenagh and Barrow Ranges, and between them in patches.

EUCALYPTUS ROSTRATA, *Schlechtendal.* W.A., Skirmish Hill.

EUCALYPTUS OCCIDENTALIS, *Endlicher.* W.A., Warangering.

Var. Victoria Desert (C. 61, 63).

EUCALYPTUS GAMOPHYLLA, *F. v. M.* S.A., near boundary of W.A., Mount Cooper in Cavenagh Range.

EUCALYPTUS EUDESMIOIDES, *F. v. M.* W.A., near Barrow Range, Victoria Desert (C. 45, 60); "Desert-gum," 30 to 45 feet; *var.* with ovate leaves, S.A., 25 miles S.S.W. from Mount Watson.

EUCALYPTUS LARGIFLORENS, *F. v. M.* S.A., Mount Ilbillee, Mount Watson; *var.*, Yeelunginna Hill (C. 4).

EUCALYPTUS OBCORDATA, *Turcz.* W.A., 40 miles N.W. from Fraser Range.

EUCALYPTUS REDUNCA, *Schauer.* W.A., Knutsford; 20 feet.

RHAMNACEÆ.

CRYPTANDRA TRIDENTATA, *Steudel.* W.A., Victoria Desert (C. 43).

CRYPTANDRA *n. sp.* W.A., Victoria Desert (C. 56).

UMBELLIFERÆ.

HYDROCOTYLE CALLICARPA, *F. v. M.* S.A., near Everard Range. Leaves less deeply slit than usual, and the keel of the fruitlets rather more prominent.

DIDISCUS ERIOCARPUS, *F. v. M.* W.A., 60 miles south from Victoria Spring, C. 63.

DIDISCUS GLAUCIFOLIUS, *F. v. M.* Var. with less divided leaves and viscid hairs at base of peduncles. W.A., various places in Barrow Range.

DIDISCUS CŒRULEUS, *De Cand.* W.A., 85 miles N.E. and E. from Esperance Bay (Gwynne).

TRACHYMENE EFFUSA, *Turcz.* W.A., 100 miles N.E. from Geraldton.

ACTINOTUS LEUCOCEPHALUS, *Bentham*, var. HUMILIS. W.A., Warangering; also Mullewa, Upper Murchison (S. Dixon). Plants not exceeding 4 inches high, usually from $1\frac{1}{2}$ to 2; umbel-stalks almost all radical, involucral bracts bearing far less vesti-ture; some of the inner flowers only bistaminate, a characteristic observed by Mr. L. Rodway also in *A. bellidioides.*

DAUCUS BRACHIATUS, *Sieber.* W.A., near Mount Squires; Fraser Range.

SANTALACEÆ.

EXOCARPOS SPARTEA, *R. Brown.* W.A., 30 miles north of Mount Churchman; 8 to 10 feet.

EXOCARPOS APHYLLA, *R. Brown.* W.A., Fraser Range; "5 to 12 feet, trunk 4 to 7 inches diameter up to 3 feet from the base, then branching."

ANTHOBOLUS EXOCARPOIDES, *F. v. M.* W.A., Skirmish Hill; a shrub 3 to 5 feet high, with divaricate branchlets. Female flowers, solitary or rarely two together, subtended by two in-volucral bracts; calyx-lobes four, yellow, longer than the short tube, oblong-linear, reflexed; ovulary broadly conical, not quite so long as the calyx; stigma large, sessile; drupe ovoid, 6 by 4·5 mm., to nearly globular, succulent; endocarp hard and smooth. Male flowers not seen.

LEPTOMERIA PREISSIANA, *A. De Cand.* W.A., Lake Lefroy and about 15 miles west of Red Hill; 4 feet; flowers white, about 10 in a raceme.

SANTALUM LANCEOLATUM, *R. Brown.* S.A., near Arcoeillinna; W.A., Cavenagh Range.

SANTALUM ACUMINATUM, *A. De Cand.* S.A., Cootanoorina. W.A., Victoria Desert (C. 48); Fraser Range and Hampton Plain.

SANTALUM PERSICARIUM, *F. v. M.* W.A., Warangering, Boorabin.

LORANTHACEÆ.

LORANTHUS MURRAYI, *Tate.* S.A., Upper Arkaringa Valley on *Acacia salicina* and *A. aneura.*

LORANTHUS EXOCARPI, *Behr.* S.A., Arkaringa Valley on *Cassia Sturtii* and *Eremophila Freelingi*, Arcoeillinna on *Acacia aneura;* W.A., Von Truer tableland (D. Cumming).

Var. LUTEA. S.A., Cootanoorina on *Acacia sp.*

LORANTHUS LINOPHYLLUS, *Fenzl.* S.A., Upper Cootanoorina Creek on *Acacia aneura;* W.A., Ernest Giles Range (D. Cumming).

LORANTHUS GIBBERULUS, *Tate.* W.A., Cavenagh Range on *Hakea lorea*, Mount Squires.

Var. About 36 miles N. W. from Southern Cross on *Hakea sp.*

LORANTHUS PENDULUS, *Sieber.* W.A., near Mount Squires, Victoria Desert (C. 36) on *Eucalypti.*

Var. AMPLEXIFOLIUS. W.A., Victoria Desert (C. 62) on *Brachychiton Gregorii.*

Var. CANESCENS has a superficial resemblance to *L. Quandang*, the leaves and flowers hoary petals; red inside, not green; flowers stalked. S.A., Cootanoorina and Arkaringa on *Acacia homalophylla.*

LORANTHUS QUANDANG, *Lindley.* W.A., Victoria Desert (C. 36) on *Acacia aneura.*

ISOPOGON DRUMMONDII, *Bentham.* W.A., near Boorabin; two to five feet high.

SIMSIA TENUIFOLIA, *R. Brown.* W.A., between Fraser Range and Esperance Bay (Gwynne). Persoon's genus *Simsia* forms only a section of *Encelia*, Cavanilles, described and figured in 1791, hence *Simsia* of R. Brown becomes restored and *Stirlingia* as a generic name must be abolished.

CONOSPERMUM TODDII, *F. v. M.* W.A., Victoria Desert (C. 54).

Var. GWYNNII. About 85 miles E.N.E. from Esperance Bay (P. A. Gwynne). Differs from the plant originally described in having more numerous leaves of less length and straightness, in less acuminated bracts, in a less slender and more deeply lobed corolla, almost glabrous outside. Should, from an ampler suite of specimens at any future time, when fruits may have also become available, it be deemed desirable to keep Mr. Gwynne's

plant apart as a species, then the variety-name should be raised to specific rank.

Bentham's variety *leianthum* of *C. polycephalum* belongs also to *C. Toddii.* The genuine *C. polycephalum* is much more rigid, its leaves are longer, less slender and less numerous, and the corolla is bluish and outside somewhat sericeous, whereas that of *C. Toddii* seems more whitish from the commencement. Moreover *C. polycephalum* belongs to the western fall of the country from the dividing range towards the west, while *C. Toddii* is restricted to parts of country stretching eastward from the watershed.

Conospermum distichum, *R. Brown.* W.A., Esperance Bay; three feet, "smoke plant" (D. Lindsay). Also at Israelite Bay, Miss Brooke; between Swan River and King George's Sound, Hon. Sir John Forrest; Box Vale, Miss Julia Wells.

Conospermum stoechadis, *Endlicher.* W.A., Karoling.

Persoonia, *sp.* W.A., Victoria Desert (C. 54), a low shrub growing on sandhills.

Xylomelum angustifolium, *Kippist.* W.A., 140 miles N.E. from Geraldton.

Lambertia inermis, *R. Brown.* W.A., between Fraser Range and Esperance Bay (Gwynne).

Grevillea pterosperma, *F. v. M.* W.A., Victoria Desert, Camps 54, 59.

Grevillea eriostachya, *Lindley.* W.A., near Skirmish Hill and Barrow Range; stigma almost terminal, broadly margined.

Grevillea juncifolia, *Hooker.* S.A., Arkaringa to Everard Range; Ferdinand River, with more glabrous inflorescence. W.A., Mount Ilbillee.

Grevillea Huegelii, *Meissner;* var. glabriflora. W.A., Esperance Bay (P. A. Gwynne).

Var. simplicifolia. W.A., Victoria Desert (C. 53, C. 59) and near Hunt's Well.

Grevillea teretifolia, *Meissner.* W.A., Boorabin. Fruit very turgid, obliquely oval, one-third to one-half inch long, slightly rough outside; pericarp crustaceous; seeds elliptic, devoid of any conspicuous marginal dilatation.

Grevillea eryngioides, *Bentham.* W.A., Mount Churchman. Fruit oblique-ovate, two-thirds to one inch long, much compressed, minutely acuminated by the remnant of the style; pericarp crustaceous. Seeds ovate, hardly above a quarter of an inch long, dark-brown, only slightly convex outward, their narrow marginal membrane wearing away.

Grevillea nematophylla, *F. v. M.* W.A., near Mount Churchman, and in the Murchison District; "a tree up to 30 feet high."

Grevillea acuaria, *F. v. M.* W.A., Victoria Desert (C. 54, C. 56, C. 59).

Agrees in every respect with Drummond's plant, except that most of the leaves are twice as broad, unless the fruit (still unknown) should reveal specific differences. The corolla is red. In the greater width of the leaves it reminds of *G. sparsiflora.*

Grevillea Helmsiana, *spec. nov.* Branchlets thinly grey-tomentellous; leaves pinnatisected, on short petioles, greyish, segments 14 or less, more erect than spreading, linear, pungent-pointed, refracted along the margin, but slightly invested with appressed hairlets beneath; racemes hardly longer than broad; flowers comparatively large; pedicels conspicuous, as well as the rachis densely beset with short appressed hairlets; corolla rather scantily provided with vestiture outside, bearing scattered hairlets up to the middle inside; pistil quite glabrous, hypogynous glandule hippocrepic, torus almost horizontal, laterally divergent; stipes free; ovulary very gibbous; style long-exserted; stigma laterally descendent.

Near Fraser's Range at Camp 71.

Total length of leaves, three inches or less; segments hardly one-tenth inch broad; bracts very fugacious; total longitudinal dimension of the coralla about three-quarters inch, but appearing less from the terminal curvature, the petals probably reddish, unless yellowish; hypogynous glandule much compressed, very prominent, the base very blunt. Fruit unknown.

This species differs from *G. stenomera* in more pointed leaf-segments, broader, never almost pendently recurved racemes, longer flowers, thicker, quite glabrous style, more angular ovulary on comparatively shorter stipes, more patent glandule, longer stigma; and the fruit characteristic, as yet inascertainable, may be also different.

This new Grevillea shows some affinity to *G. longistyla*, particularly in reference to aspect of the racemes; but the stipes adnate to the descending torus and the vestiture of the ovulary distinguish it also from the form with smaller leaves.

G. leucophris and *G. tripartita* come also in some respects near our new species.

Grevillea Treuriana, *F. v. M.* W.A., Victoria Desert (C. 59). This species differs from *G. asparagoides* besides the characteristics originally indicated (Fragm. Phyt. Austral., IX., p. 123) in the color of the floral vestiture, grey not brownish, unless at the summit of the flowers.

Hakea lorea, *R. Brown.* S.A., Arkaringa Valley and near Everard Range; W.A., Cavenagh and Barrow Ranges. "Cork-bark tree," attaining to 20 feet; bark corky, deeply fluted, three and a half inches at most, half-inch at least in thickness.

HAKEA ROEI, *Bentham.* W.A., near Boorabin; four to six feet. The fruit is similar to that of *H. incrassata*, but is more oval, with the pointed apex more terminal and the surrounding seed-membrane is quite pale.

HAKEA PREISSII, *Meissner.* W.A., Murchison district; petals yellow inside; also on the Irwin River.

HAKEA PLATYSPERMA, *Hooker.* W.A., between Boorabin and Guardanoolagin, two to seven feet.

HAKEA FALCATA, *R. Brown.* W.A., near Boorabin; Waranger-ing, two to five feet.

HAKEA GLABELLA, *R. Brown.* W.A., 36 miles N.W. from Southern Cross, five to ten feet.

BANKSIA PRIONOTES, *Lindley.* W.A., 140 miles N.E. from Geraldton.

BANKSIA ELDERIANA, *n. sp.* W.A., Victoria Desert (C. 54).

Branchlets grey-tomentellous; leaves on short petioles, rigid, much elongated, but rather narrow, flat, serrate-pinnatifid, on their upper side the venulation concealed, on their lower side faintly reticulated, the foveoles there slightly whitish-tomentel-lous; lobes of the leaves semicuneate-deltoid; inflorescencence oval-ellipsoid; petals very narrow, outside to about the middle almost sericeous, their upper portion glabrous or glabrescent, canaliculate-linear, blunt; anthers quite narrow; style only towards its base beset with short hairlets; fruitlets densely pubescent at their lower portion, glabrescent towards the some-what acutangular summit; seeds cuneate-deltoid, terminated by a membranous appendage quite as long and considerably broader.

Well-developed leaves seven to ten inches long, hardly ever exceeding half-inch in breadth, almost of equal colour on both sides, downward gradually narrowed, also upwards less broad than near the middle. Flowers only seen as remnants among the fruitlets, thus the colour unascertainable; the styles all broken, so that no stigma remained. United mass of fruitlets four to five inches long; individual fruitlets two-thirds to nearly one inch broad. Seeds-testule and its appendicular protraction black. Bears some resemblance to *B. lævigata*, though the leaves are much longer and not truncate, besides having far longer lobes, while also the indument of the petals is very different. From *B. media* it is similarly distinguished, as mentioned above, by the form of the leaves, which moreover are not much paler under-neath, but the characteristics of the petals are almost the same. What Sir Joseph Banks for material support has been to the science of Britain at his time, that Sir Thomas Elder has been in promoting scientific knowledge for South Australia at our period; hence this plant is chosen to connect his honored name with that of the British Mæcenas in a genus, which was named already by Linnæus—the younger.

This species seems to form one of the eastern outposts of the vast mass of western Banksias, and may be still more limited in its range than *B. ornata*. The celebrated and very venerable Edw. J. Eyre (Journ. of Discovery—Expedit., II., 14) met the first western Banksia, perhaps *B. media*, at Point Dover; therefore, still a degree further east than the longitude in which *B. Elderiana* appears. *B. marginata* does not seem to penetrate westward beyond Marble Range, 30 miles N.W. from Port Lincoln.

The following notes on the geographic distribution of some Banksias may not be inopportunely offered:—

B. sphærocarpa at the Irwin and Arrowsmith Rivers, *F. v. M.*

B. occidentalis at Wilson's Inlet, *F. v. M.;* petals yellow, style bright-red.

B. attenuata extends with *B. prionotes* northward to near Shark's Bay, *F. v. M.;* flowers yellow.

B. Menziesii at Greenough River, *F. v. M.;* bark verrucose, petals yellow, style red and just below the stigma remarkably constricted.

B. nutans at Greenough River; petals beset on the outside with silver-grey hairlets.

RUBIACEÆ.

Oldenlandia elatinoides, *F. v. M.* W.A., Karolin.

Canthium latifolium, *F. v. M.* S.A., Upper Arkaringa Valley, near Wa-Wee Waterhole, Everard Range. W.A., Ernest Giles' Range (D. Cumming).

Canthium oleifolium, *Hooker.* W.A., Victoria Desert.

Opercularia scabrida, *Schlecht.* W.A., Victoria Desert (C. 57), with shorter peduncles than usual; Yerdanie, and near Red Kangaroo Hill.

Pomax umbellata, *Solander.* S.A., near Mount Watson. W.A., Victoria Desert (C. 54).

CUCURBITACEÆ.

Melothria Maderaspatana, *Cogn.* S.A., Everard and Birksgate Ranges.

COMPOSITÆ.

Brachycome ciliaris, *Lessing.* S.A., Warrina; W.A., Victoria Desert (C. 53), Fraser Range.

Brachycome Muelleri, *Sonder* (?). W.A., Victoria Springs.

Minuria leptophylla, *DeCand.* S.A., Arkaringa Valley.

Minuria Cunninghamii, *Bentham.* S.A., Arkaringa.

Minuria Candollei, *F. v. M.*, forma denticulata. S.A., Cootanoorina.

MINURIA SUAEDIFOLIA, *F. v. M.* W.A., near Fraser Range (C. 65), Southern Cross.

CALOTIS ERINACEA, *Steetz.* S.A., Upper Arkaringa Valley; var. with profusedly divaricate ramification and minute leaves. W.A., Cavenagh and Barrow Ranges.

CALOTIS CYMBACANTHA, *F. v. M.* S.A., Warrina and between Nilpena and Cootanoorina; W.A., long. 122°, lat. 26° 30′ (D. Cumming).

CALOTIS LATIUSCULA, *F. v. M.* and *Tate.* S.A., Upper Cootanoorina Valley and along Arkaringa Creek.

CALOTIS PLUMULIFERA, *F. v. M.* S.A., Upper Arkaringa Valley; W.A., Victoria Desert (C. 53, C. 54).

CALOTIS HISPIDULA, *F. v. M.* S.A., Cootanoorina, near Mount Watson, and Birksgate Range; W.A., near Mount Squires.

ASTER MITCHELLI, *F. v. M.* S.A., around Everard Range; W.A., Victoria Spring and Lake Lefroy.

ASTER EXIGUIFOLIUS, *F. v. M.* W.A., between Red Hill and Yilgarn.

ASTER MUELLERI, *Sonder.* W.A., Victoria Desert (C. 59, 61).

ASTER MEGALODONTUS, *F. v. M.* S.A., Everard Range; W.A., near Mount Squires. The leaves are more elongated and, therefore, proportionately narrower than those of the plant as originally described. As regards aspect, it is not dissimilar to *Pterigeron dentatifolius*, but in floral characters very distinct.

VITTADINIA AUSTRALIS, *A. Richard.* S.A., Arkaringa Valley; W.A., Victoria Desert (C. 53) and Fraser Range.

PLUCHEA CONOCEPHALA, *F. v. M.* W.A., Victoria Spring, thence to Fraser Range and Lake Lefroy; var. MICROPHYLLA, Lake Lefroy; var. SUBSPINESCENS, near Hunt's Well.

PLUCHEA DENTEX, *R. Brown.* S.A., Everard and Birksgate Ranges. Known also from the Finke River (Rev. H. Kempe), near MacDonnell Range and Mount Olga (E. Giles), previously recorded as *P. Eyreana;* also near the Isaac's River (P. O'Shanesy). In the "Botany of the Horn Expedition" this species is quoted under *P. squarrosa.* Irrespective of other characteristics already promulgated, the leaves are narrower than those of *P. squarrosa*, and the headlets generally on longer stalks. As in the closely allied species, the corollas are purple.

PTERIGERON LIATROIDES, *Bentham.* W.A., near Hunt's Well.

PTEROCAULON SPHACELATUS, *Bentham & J. Hooker.* S.A., Cootanoorina Creek.

Var., W.A., Cavenagh Range. "The plant emitted a scent like that of ripe apples, even a long time after being dried."

GNAPHALIUM JAPONICUM, *Thunberg.* W.A., Fraser Range and near Lake Deborah.

Gnaphalium indutum, *J. Hooker.* S.A., Arkaringa Creek.

Ixiolæna leptolepis, *Bentham.* S.A., Arkaringa Valley; W.A., Fraser Range.

Ixiolæna tomentosa, *Sonder & F. v. M.* S.A., Arkaringa Valley.

Podolepis canescens, *Cunningham.* S.A., Everard Range.

Var. affinis, *Sonder.* W.A., near Mount Squires, Barrow Range, Victoria Desert (C. 50, C. 53).

This plant differs from *P. pallida* in not distinctly rugulose involucral bracts and pronounced yellowish peripheral corollas. The specimens from Victoria Desert show the ligules exceptionally deeply slit.

Podolepis rugata, *Labil.* W.A., near Fraser Range (C. 65) and towards Esperance Bay.

Podolepis Siemssenii, *F. v. M.* S.A., Upper Arkaringa Valley and Arcoeillina. W.A., Victoria Desert (C. 53) and Fraser Range.

Athrixia tenella, *Bentham.* W.A., near Fraser Range (C. 66).

Waitzia corymbosa, *Wendland.* W.A., near Mount Squires, Victoria Desert (C. 50-54), Fraser Range.

Helipterum floribundum, *De Cand.* S.A., Arkaringa and towards Everard Range. W.A., Victoria Desert (C. 53, C. 54) and Fraser Range.

Helipterum Fitzgibboni, *F. v. M.* W.A., Mount Squires and Victoria Desert (C. 40, C. 53).

Helipterum stipitatum, *F. v. M.* S.A., Arkaringa Creek and Upper Arkaringa Valley. W.A., near Mount Squires and Barrow Range, also a variety dwarfed to one and a-half inches; Victoria Desert (C. 50, C. 53).

Helipterum Humboldtianum, *De Candolle.* W.A., Fraser Range.

Helipterum tenellum, *Turczaninow.* W.A., Fraser Range and near Lake Deborah.

Helipterum strictum, *Bentham.* W.A., near Mount Squires and Barrow Range, Victoria Desert (C. 53).

Helipterum pygmæum, *Bentham.* W.A., near Fraser Range (C. 66), Karolin.

Helipterum moschatum, *Bentham.* S.A., Birksgate Range.

Helipterum pterochætum, *Bentham.* S.A., Arcoeillina, 15 miles W. of Wa-wee waterhole; W.A., Victoria Desert (C. 53).

Helipterum dimorpholepis, *Bentham.* W.A., Fraser Range.

Helipterum Troedelii, *F. v. M.* W.A., near Fraser Range.

Helichrysum cassinianum, *Gaud.* W.A., near Mount Squires, Victoria Desert (C. 51, 53), Fraser Range.

Helichrysum Lawrencella, *F. v. M.* S.A., towards Everard

Range; W.A., near Mount Squires, Victoria Desert (C. 54), with glabrous achenes and with a pappus transitory to that of *Helipterum*.

HELICHRYSUM AMBIGUUM, *Turcz.* S.A., Arkaringa Creek, Everard Range. W.A., near Barrow Range, with narrower more ciliolated involucral bracts; Victoria Desert (C. 50), Fraser Range.

HELICHRYSUM APICULATUM, *De Cand.* S.A., Warrina to Everard Range; W.A., near Mount Ilbillee soakage, Fraser Range.

HELICHRYSUM AYERSII, *F. v. M.* S.A., towards Everard Range; W.A., near Mount Squires.

HELICHRYSUM ADNATUM, *Bentham.* W.A., 85 miles N.E. by E. from Esperance Bay (Gwynne).

Headlets in an unopened state almost globular, or verging into an ovate-ellipsoid form as also in *H. lepidophyllum*; but likewise probably when fully developed campanular-hemiellipsoid. The latter species, however, has its leaves always bent downward, never erect; they are moreover usually shorter and always proportionately much broader. In the Elder-Expedition plant the leaves are adnate at and near the median line of upper side to their middle or even beyond, towards the margin free. It differs mainly from *H. diotophyllum* in having the leaves more adnate, and not conspicuously and suddenly dilated at and near the base and in having the floral bracts not yellowish. It is distinct from the genuine *H. decurrens* in, though adnate, yet not really decurrent leaves, which have an acute apex. From *H. retusum* it is removed by the form of the leaves and the color of the flower-headlets.

Unrecorded localities of the several closely-allied plants here alluded to are :–

Helichrysum adnatum, Wimmera (Matthews); between the Darling and Lachlan River (G. Day).

Helichrysum diotophyllum, near the Lachlan River (G. Tucker), near Darling River (G. Day), Upper Balonne River (Scortechini).

Helichrysum decurrens, Fowler's Bay (Mrs. Richards).

Helichrysum lepidophyllum, Upper Kalgan River (F. v. M.), Tone River (Muir).

RUTIDOSIS HELICHRYSOIDES, *De Cand.* S.A., between Wa-wee waterhole and Everard Range.

HUMEA GRACILLIMA, *n. sp.* W.A., Victoria Desert (C, 44).

Annual, very small, somewhat rough from minute glandules; stems one or more, extremely slender, often unbranched; leaves very short, filiform-linear, blunt; headlets quite small, terminal, solitary, almost hemispheric; involucral bracts comparatively

broad, glabrous, hardly acute, the outer dull-purplish, the inner yellow, with deltoid-orbicular radiating plate on a broad transparent stipes; flowers scarcely exceeding the involucre, numerous; tube of the corolla beset with glandules; achenes ellipsoid-ovate, glabrous, somewhat pellucid.

The specimens gathered from one and a half to five inches high; leaves one-eighth to half-inch long, those at the root crowded; headlets one-quarter to one-third inch broad, the involucral bracts appressed; corolla-lobes conspicuous; anthers partly exserted; achenes many times shorter than the corollas, hardly seen ripe. Resembles strikingly *Helipterum Jesseni*, but no trace of any pappus does exist. The plant is also closely allied to *Acomis macra*.

HUMEA TENERRIMA, *n. sp.* S.A., near Mount Ilbillee.

A minute and remarkably delicate plant, but in incipient inflorescence only. It is scantily pubescent, the leaves are very small, thinly petiolate, ovate-lanceolar, pellucid; the headlets are scattered, extremely small, with white broadish involucral bracts and with but few flowers, one of which occasionally very slender and bearing an exserted bifid style. No pappus could be discerned, owing perhaps to the very young state of the specimens. If it is really absent we would have another *Humea*, but perhaps this curious plantlet may belong to *Helichrysum* or some other allied genus. It resembles somewhat *Rutidosis Pumilio*, but the leaves are as delicately membranous as those of *Stellaria media*.

MILLOTIA KEMPEI, *F. v. M.*, var. HELMSII. S.A., Birksgate Range to the border of W.A.

Procumbent to the breadth of nearly one foot; headlets often as broad as their length; involucral bracts only bearing a slight glandular-viscid vestiture, not a lanuginous indument as in the type. Ripe fruit not known. A similar variability has been observed in *M. Greevesii*. This species brings the genus *Millotia* into close contact with *Toxanthus*.

TOXANTHUS PERPUSILLUS, *Turcz.* S.A., Everard Range at 2,000 ft.; also W.A., at Yilgarn (Mr. Merrall).

TOXANTHUS MAJOR, *Turcz.* W.A., Victoria Desert (C. 54).

MYRIOCEPHALUS RHIZOCEPHALUS, *Bentham.* W.A., Cavenagh Range, Victoria Desert (C. 53), Fraser Range.

MYRIOCEPHALUS STUARTII, *Bentham.* S.A., Cootanoorina and Birksgate Range.

ANGIANTHUS TOMENTOSUS, *Wendland.* W.A., Fraser Range and near to (C. 64).

ANGIANTHUS PUSILLUS, *Bentham.* S.A., Arkaringa Valley; W.A., Mount Squires, Victoria Desert (C. 53, 60), Karolin.

ANGIANTHUS STRICTUS, *Bentham.* W.A., Victoria Spring, Fraser Range, Quardanoolagin.

Gnephosis . W.A., Fraser Range; Camp 64.
Gnephosis . W.A., Victoria Desert (C. 53).
Cephalipterum Drummondii, *A. Gray*. W.A., Fraser Range.
Gnaphalodes uliginosum, *A. Gray*. W.A., Fraser Range.
Gnaphalodes condensatum, *A. Gray*. W.A., Victoria Desert (C. 53) and near Fraser Range (C. 66). A small but caulescent form.
Siegesbeckia orientalis, *Linné*. S.A., foot of Everard Range.
Flaveria Australasica, *Hooker*. S.A., Arkaringa Valley.
Senecio Gregorii, *F. v. M.* S.A., Cootanoorina, Upper Arkaringa Valley. W.A., Fraser Range.
Senecio magnificus, *F. v. M.* S.A., foot of Everard Range.
Senecio lautus, *Solander*. W.A., near Mount Squires and Fraser Range.
Senecio brachyglossus, *F. v. M.* S.A., Arkaringa; W.A., near Warangering.
Erechtites quadridentata, *De Cand.* S.A., Arkaringa; W.A., Fraser Range.
Erechtites lacerata, *F. v. M.* S.A., foot of Everard Range.

CAMPANULACEÆ.

Lobelia heterophylla, *Labil.* W.A., Fraser Range and between Red Hill and Yilgarn.
Isotoma petræa, *F. v. M.* S.A., Arkaringa Valley, Everard Range. W.A., Fraser Range; Yerdanie (with white flowers).
Wahlenbergia gracilis, *De Cand.* S.A., Arkaringa Creek. W.A., Mount Squires, Fraser Range, Karolin, &c.

CANDOLLEACEÆ.

Candollea pilosa, *Labillardiere*. W.A., 85 miles N.E. by E. from Esperance Bay (Gwynne).
Candollea limbata, *F. v. M.* W.A., Victoria Desert (C. 57-59), near Gnarlbine.
Candollea breviscapa, *F. v. M.* W.A., Victoria Desert (C. 54, 56), Karolin.
Leuwenhoekia stipitata, *F. v. M.* W.A., Karolin.

GOODENIACEÆ.

Brunonia australis, *Smith*. W.A., near Mount Squires and Barrow Range.
Dampiera luteiflora, *F. v. M.* W.A., near Warangering.
Dampiera alata, *Lindley*. W.A., between Red Hill and Yilgarn.
Several other species of this difficult genus, mostly without ripe fruit, are reserved for critical examination.

Leschenaultia heteromera, *Bentham.* W.A., near Gnarlbine and between Fraser Range and Esperance Bay; var. with longer, less-pointed leaves, the corolla blue, and to one inch long; Victoria Desert (C. 42, 44, 58).

Scævola spinescens, *R. Brown.* S.A., Wa-wee waterhole; W.A., near Mount Squires, Victoria Desert (C. 53), Fraser Range, Von Truer tableland (D. Cumming).

Scævola oxyclona, *F. v. M.* W.A., Fraser Range, a low bush, hemispherically spreading to three feet diameter.

Scævola depauperata, *R. Brown.* S.A., about Mount Watson, on sandy soil; branches shortly hairy or scabrous.

Scævola fasciculata, *Bentham.* W.A., near Yerdanie and Gnarlbine.

Scævola Reinwardtii, *De Vriese.* W.A., near Warangering.

Goodenia scapigera, *R. Brown.* W.A., 85 miles N.E. from Esperance (Gwynne).

Goodenia Ramelii, *F. v. M.* W.A., near Mount Squires. The style is villous, and the stigma-cover is distinctly ciliolate; the calyx-lobes are rather longer than usual.

Goodenia pinifolia, *De Vriese.* W.A., near Southern Cross.

Goodenia Elderi, *n. sp.* W.A., on sandy places near Gnarlbine and Warangering.

Erect, somewhat lignescent; stems and branches bearing a thin whitish tomentum; leaves mostly rather short, very slender, filiform, as well as the inflorescence almost glabrous; peduncles terminating branchlets, bearing few or several racemose paniculate flowers; bracts leaflike; pedicels mostly longer than the flowers, bearing midway two linear bracteoles; lobes of the calyx at first much longer than the tube, narrow-linear; lobes of the corolla all expanding into whitish upward-narrowed membranes; anthers narrow, blunt; style beset with short spreading hairlets; stigma-cover except its base glabrous; fruit oval-ellipsoid; dissepiment high; seeds several in each cell.

Height of plant to two feet, as far as seen; its taste bitter. Root perpendicularly descending, unbranched, scantily fibriliferous. Ramification upwards short. Longest leaves measuring one and a-half inches; length of most less than an inch; many of the leaves by abbreviation of branchlets somewhat fasciculate. Tube of the corolla unilaterally protruding to a slight extent; somewhat beset with hairlets along the sutures. Membranous lobe-expansions of inconsiderable width; stigma-cover longer than broad, even at the orifice, glabrous. Ripe fruit not available. Seeds imbricate in two rows within each cell.

This rich-flowering species approaches in some of its characteristics to *G. pinifolia*, in others to *G. scapigera.* With the former it agrees much in foliage, but the calyces are much larger,

the fruits many-seeded and of different structure, though the membrane of the corolla-lobes is also white in that plant. The analysis by Ver Huell, given for the fruit in De Vriese's Goodenovieæ, shows ripe seeds as ample as the fruit cavity; we find them much smaller and rather numerous, but in the present species they may not be fully ripe, though already quite dark. With *G. scapigera* our new plant shares in the shape of the calyces and fruits, size of dissepiment and number of seeds, differing, however, extremely in foliage, much closer inflorescence, and much longer pedicels.

GOODENIA WATSONI, *n. sp.* W.A., near Gnarlbine.

Perennial, herbaceous, almost glabrous; leaves nearly all radical, narrowly lanceolar or elliptic-cuneate, gradually narrowed into their petioles, remotely denticulated from the middle upward or only towards the summit; axils of petioles lanuginous; stems peduncle-like; panicle rather long but contracted; flowers small; pedicels short, most of them minutely bibracteolate about the middle; expanding membranes of the corolla-lobes white, narrow without terminal dilations; anthers blunt; style beset with minute hairlets; stigma-cover glabrous except with a hardly perceptible ciliolation at the orifice; fruit very small, globular-oval; dissepiment reaching to beyond the middle of the cavity; seeds several in each cell, minute, dark-brown, flat, devoid of marginal expansion.

Here again we have a combination of characteristics of *G. scapigera* and *G. pinifolia*, but reversedly as compared to those of *G. Elderi*. Thus *G. Watsoni* has the leaves like those of *G. scapigera*, but the small flowers and fruits quite similar to those of *G. pinifolia*, though in much less spreading panicle.

The species name is in compliment to Professor Watson, of the Adelaide University, who as Sir Thomas Elder's representative has so largely identified himself with the organisation of the Expedition.

GOODENIA STROPHIOLATA, *F. v. M.* W.A., 30 miles N.W. from Fraser Range, Karolin. Also found at Parker's Range and Yilgarn by Merrall, between the Great Bight and Victoria Spring by Crawford, and near Youndegin by Miss A. Eaton.

GOODENIA XANTHOSPERMA, *F. v. M.* W.A., Victoria Desert (Camps 44, 50, 54). The radical leaves provided only with very short petioles, the thick portion of the corolla-lobes thinly pubescent on the outside.

GOODENIA INCANA, *R. Brown.* W.A., near Warangering.

GOODENIA CŒRULEA, *R. Brown.* W.A., between Red Hill and Yilgarn, and near Warangering.

GOODENIA HETEROCHILA, *F. v. M.* S.A., Arcoeillina Well and Upper Arkaringa Valley; near Mount Watson (C. 17). A

small-leaved variety, with larger seeds. W.A., Barrow Range, Victoria Desert (C. 50); var. ANGUSTIFOLIA.

GOODENIA PINNATIFIDA, *Schlecht.*, var. MINOR. W.A., Fraser Range. The seeds are pale brown, but not matured.

GOODENIA CONCINNA, *Bentham.* W.A., near Mount Squires; a tall variety, with roundish-oval fruits, and larger, more membranously-margined seeds, Victoria Desert (C. 54). The corolla in typical specimens is minutely puberulous externally, and its lobes are almost truncate, not as in *G. filiformis* anteriorly bilobulate.

GOODENIA MICROPTERA, *F. v. M.* W.A., Victoria Desert (C. 53), offers an approach to *Calogyne Berardiana.*

VELLEYA CONNATA, *F. v. M.* W.A., from Skirmish Hill to Victoria Desert (C. 53); a form with somewhat pinnati-lobed radical leaves and with indented bracts.

VELLEYA DISCOPHORA, *F. v. M.* W.A., near Gnarlbine, two feet high, radical leaves elliptic-spathulate, three inches long, somewhat serrulate; also Annean (S. Dixon).

VELLEYA CYCNOPOTAMICA, *F. v. M.* W.A., Victoria Desert (C. 53, 62); flowers pink.

VELLEYA PARADOXA, *R. Brown.* W.A., near Barrow Range and Victoria Desert (C. 41, 51, 53).

GENTIANEÆ.

ERYTHRÆA SPICATA, *Persoon.* W.A., between Red Hill and Yilgarn.

LOGANIACEÆ.

LOGANIA STENOPHYLLA, *F. v. M.* W.A., Victoria Desert (C. 59).

LOGANIA NUDA, *F. v. M.* W.A., Victoria Desert (C. 59); flowers pale-yellow.

LOGANIA FLAVIFLORA, *F. v. M.* W.A., near Gnarlbine; a dwarf state, flowers primrose-yellow.

PLANTAGINEÆ.

PLANTAGO VARIA, *R. Brown.* S.A., Cootanoorina, Arkaringa; W.A., Fraser Range.

JASMINEÆ.

JASMINUM LINEARE, *R. Brown.* S.A., Everard Range.

JASMINUM CALCAREUM, *F. v. M.* W.A., Victoria Desert (C. 54).

APOCYNEÆ.

ALYXIA BUXIFOLIA, *R. Brown.* W.A., Victoria Desert (C. 54) Fraser Range.

ASCLEPIADEÆ.

Sarcostemma australe, *R. Brown.* S.A., Upper Arkaringa Valley; W.A., Von Truer Tableland (D. Cumming).

Dæmia Kempeana, *F. v. M.* S.A., Upper Arkaringa Valley; W.A., Fraser Range.

Marsdenia Leichardtiana, *F. v. M.* W.A., Fraser Range, near Mount Kenneth.

CONVOLVULACEÆ.

Convolvulus erubescens, *Sims.* S.A., Upper Arkaringa Valley, Everard Range; W.A., Fraser Range.

Ipomœa heterophylla, *R. Brown.* S.A., Cootanoorina Creek.

Breweria rosea, *F. v. M.* S.A., between Peculiar Hill (C. 15) and Mount Watson (C. 16). W.A., near Barrow Range, Victoria Desert (C. 54).

Evolvulus linifolius, *Linné.* W.A., Mount Squires.

Wilsonia humilis, *R. Brown.* W.A., Victoria Desert (C. 68) and between Red Hill and Yilgarn.

SOLANACEÆ.

Solanum simile, *F. v. M.* W.A., Lake Deborah.

Solanum ferocissimum, *Lindley.* S.A., Ferdinand River; W.A., Mount Ilbillee.

Solanum orbiculatum, *Dunal.* W.A., Victoria Desert (Camps 45, 53, 61), Fraser Range, Lake Deborah. Berry whitish, with green stripes.

Solanum esuriale, *Lindley.* S.A., Arkaringa Valley. W.A., West of Ernest Giles Range (D. Cumming).

Solanum Sturtianum, *F. v. M.* S.A., Warrina; W.A., near Mount Squires.

Solanum Oldfieldii, *F. v. M.* W.A., near Barrow Range, Victoria Desert (C. 50-59), Fraser Range.

Solanum hystrix, *R. Brown.* W.A., near Fraser Range (C. 67-68), near Gnarlbine.

Solanum eremophilum, *F. v. M.* S.A., Everard Range, at 2,000 feet; W.A., 25 miles N.W. from Fraser Range.

Solanum petrophilum, *F. v. M.* S.A., Mount Watson.

Solanum lasiophyllum, *Dunal.* W.A., Victoria Desert (C. 53), Fraser Range, near Mount Churchman (C. 94); Von Treuer Tableland (D. Cumming).

Solanum ellipticum, *R. Brown.* S.A., Upper Arkaringa Valley; W.A., var. pannifolium, Victoria Desert (C. 53 and 54).

Nicotiana suaveolens, *Lehmann.* S.A., Warrina, Arkaringa Valley, near Ferdinand River, Birksgate Range, Blyth Hills;

W.A., near Mount Squires, Victoria Desert (C. 53-61), Fraser Range.

ANTHOTROCHE BLACKII, *F. v. M.* W.A., Victoria Desert (C. 54, 56).

DUBOISIA HOPWOODI, *F. v. M.* S.A., Arkaringa Creek and Upper Arkaringa Valley (8-10 feet); W.A., Victoria Desert (C. 40, 43 (3-5 feet), 59) and Fraser Range.

SCROPHULARINÆ.

STEMODIA VISCOSA, *Roxburgh.* S.A., near Mount Watson and Birksgate Range; W.A., 100 miles N.E. from Geraldton.

PEPLIDIUM MUELLERI *Bentham.* S.A., Arkaringa Valley.

LIMOSELLA AQUATICA, *Linné.* W.A., Karolin.

BIGNONIACEÆ.

TECOMA AUSTRALIS, *R. Brown.* S.A., Everard Range, at 2,000 feet; W.A., Barrow Range.

ACANTHACEÆ.

JUSTICIA PROCUMBENS, *Linné.* S.A., Arkaringa Creek.

LABIATÆ.

PLECTRANTHUS PARVIFLORUS, *Henckel.* S.A., Everard Range, at 2,000 feet.

PROSTANTHERA WILKIEANA, *F. v. M.* S.A., near Coffin Hill and near Mount Watson. A small-flowered state, with silky pubescence.

PROSTANTHERA BAXTERI, *Cunn.* S.A., 70 miles S.W. from Mount Watson; W.A., Victoria Desert (C. 61), near Gnarlbine, 50 miles N.N.E. from Knutsford.

PROSTANTHERA STRIATIFLORA, *F. v. M.* S.A., Arcoeillina; Arkaringa Valley, var. with long silky leaves; Everard Range, up to 2,500 feet.

PROSTANTHERA COCCINEA, *F. v. M.* W.A., near Gnarlbine.

WESTRINGIA CEPHALANTHA, *F. v. M.* W.A., near Gnarlbine, two to four feet.

WESTRINGIA RIGIDA, *R. Brown.* S.A., Arkaringa; W.A., Victoria Desert (C. 54, 56, 57), a form with longer leaves and larger flowers.

TEUCRIUM SESSILIFLORUM, *Bentham.* W.A., Fraser Range.

TEUCRIUM FILILOBUM, *F. v. M.* W.A., Fraser Range, an undershrub, one foot.

TEUCRIUM RACEMOSUM, *R. Brown.* S.A., Arkaringa Valley, the form with narrow leaf-segments.

TEUCRIUM GRANDIUSCULUM, *F. v. M.* and *Tate.* S.A. and W.A., an undershrub, one and a half feet; also Ooldea, Great Australian Bight (R.T.).

VERBENACEÆ.

Spartothamnus teucriiflorus, *F. v. M.* S.A., Arkaringa Valley; W.A., Skirmish Hill, near Mount Squires, Victoria Desert (C. 40); Ernest Giles Range (D. Cumming).

Lachnostachys Cliftoni, *F. v. M.*, a var. with closer vestiture and smaller leaves. W.A., 20 miles N.W. from Lake Lefroy.

Lachnostachys verbascifolia, *F. v. M.*, a var. with thinner tomentum and more compound inflorescence. W.A., near Esperance Bay (Gwynne).

Newcastlia bracteosa, *F. v. M.* S.A., 70 miles S.W. from Mount Watson; W.A., Victoria Desert (C. 53, 54).

Newcastlia chrysotricha, *F. v. M.* S.A., 70 miles S.W. from Mount Watson, Birksgate Range; W.A., Victoria Desert (C. 54).

Newcastlia spodiotricha, *F. v. M.* S.A., Pernamo Hill (C. 22).

Newcastlia cephalantha, *F. v. M.* S.A. Upper Arkaringa Valley and to towards Everard Range; in these specimens the corolla is larger and somewhat exceeded by the stamens; the upper part of the corolla-lobes, as well as the filaments and style, are blue. W.A., near Mount Squires, near Barrow Range, Victoria Desert (C. 53); also now known from the Georgina River (Alfr. Henry) and the Alfred and Marie Range (E. Giles).

Dicrastylis ochrotricha, *F. v. M.* S.A., Mount Watson and 70 miles S.W.; W.A., Barrow Range (two to three and a half feet), Victoria Desert (C. 53).

Dicrastylis Nicholasii, *F. v. M.* W.A., Victoria Desert (C. 57).

Dicrastylis parvifolia, *F. v. M.* W.A., near Gnarlbine, 20 miles N.W. from Lake Lefroy.

Chloanthes stachyodes, *F. v. M.* W.A., near Warangering.

Chloanthes loricata, *F. v. M.* W.A., Victoria Desert (C. 41), near Gnarlbine.

Chloanthes Teckiana, *F. v. M.* W.A., Knutsford.

Chloanthes cœrulea, *n. sp.* W.A., near Gnarlbine (Helms), also near Parker's Range (Edwin Merrall).

Leaves much crowded and often ternately or quarternately verticillate, sessile, broad-linear, revolute at the margin, above scantily lanuginous and somewhat rugulose, beneath as well as the branches white-tomentose; flowers blue in a contracted leafy panicle; lower bracts foliaceous; calyx small, deeply cleft into narrow semi-lanceolate lobes, stellately-tomentellous outside; corolla wider than long, deeply-lobed, its tube broad, outside intricately pubescent, inside glabrous, the lowest lobe the largest; stamens considerably shorter than the corolla, their filaments rather thick, glabrous to the base; anthers unprovided with

appendages ; fruit quite small, globular, black, pitted or irregularly reticulate-ridged, with a very narrow basal cavity seceding into its four partitions, each one-seeded.

Well-developed leaves about one inch long, seldom more than one-eighth inch broad, mostly erect. Lower bracts to one-half inch long. Inflorescence two to five inches long, terminating branchlets. Calyx one-eighth to one-sixth inch long. Corolla deep-blue at least towards the base, measuring about half an inch diametrically; filaments yellowish, fixed near the base of the corolla, attenuated towards their lower end. Anthers dorsifixed, yellow, when expanded roundish ; style, one-quarter inch long, capillulary, glabrous; stigma very minute, acutely bilobed. Fruit measuring only one-eighth inch. Nearest to *C. halganiacea.*

Hemiphora Elderi, *F. v. M.* W.A., Victoria Desert (C. 57, 58), between Red Hill and Yilgarn.

Cyanostegia Turczaninowii, *F. v. M.* W.A., var. dentata, near Gnarlbine ; var. angustifolia, between Red Hill and Yilgarn.

MYOPORINÆ.

Eremophila leucophylla, *Bentham.* W.A., Victoria Desert (C. 54).

Var. Turtoni. W.A., near Barrow Range, Victoria Desert (C. 50), two to three feet.

Eremophila rotundifolia, *F. v. M.* S.A., Arkaringa Valley, three to four feet ; flowers lilac, rarely white.

Eremophila oppositifolia, *R. Brown.* S.A., 30 miles S.W. from Yeeluginna Hill (C. 4) ; W.A., Victoria Desert.

Eremophila Paisleyi, *F. v. M.* W.A., near Gnarlbine.

Eremophila Dempsteri, *F. v. M.* W.A., Victoria Desert (C. 61), 4 to 10 feet ; flowers lilac.

Eremophila Gibsoni, *F. v. M.* W.A., Victoria Desert (C. 48, 49) ; leaves much recurved at the apex, corolla bluish.

Eremophila Clarkei, *F. v. M.* S.A., Arkaringa Valley ; a variety, flowers lilac, rarely pink.

Eremophila Latrobei, *F. v. M.* S.A., Warrina, Arkaringa Creek and Valley ; W.A., near Mount Squires, Victoria Desert (C. 40).

Eremophila longifolia, *F. v. M.* S.A., Arkaringa Valley, near Everard Range ; W.A., Victoria Spring, Fraser Range.

Eremophila Freelingii, *F. v. M.* S.A., Cootanoorina to Arcoeillinna.

Eremophila Macdonnelli, *F. v. M.* S.A., Warrina to Arcoeillinna.

Eremophila Willsii, *F. v. M.* S.A., Upper Arkaringa Valley ; a variety with somewhat narrower and less-crowded leaves. W.A., near boundary and Barrow Range.

EREMOPHILA BROWNII, *F. v. M.* S.A., Arkaringa Valley; W.A., Victoria Desert (C. 53), Gnarlbine.

EREMOPHILA LATIFOLIA, *F. v. M.* S.A., Arcoeillinna, Everard Range; W.A., Victoria Desert (C. 54), Fraser Range

EREMOPHILA DUTTONII, *F. v. M.* S.A., Upper Arkaringa Valley.

EREMOPHILA ALTERNIFOLIA, *R. Brown.* S.A., Arkaringa Valley; W.A., Fraser Range

EREMOPHILA HUGHESII, *F. v. M.* W.A., near Barrow Range; also now known from Mount Narryer (Isaac Tyson).

EREMOPHILA SCOPARIA, *F. v. M.* W.A., Victoria Desert (C. 54, 61), Fraser Range

MYOPORUM DAMPIERI, *Cunn.* W.A. Victoria Desert (C. 49).

MYOPORUM DESERTI, *Cunn.* W.A., Cootanoorina.

MYOPORUM PLATYCARPUM, *R. Brown.* W.A., Victoria Desert (C. 54, 65), Fraser Range.

ASPERIFOLIÆ.

CYNOGLOSSUM DRUMMONDII, *Bentham.* S.A., Arkaringa.

LAPPULA CONCAVA, *F. v. M.* W.A., near Mount Squires, Fraser Range.

ERITRICHIUM AUSTRALICUM, *DeCand.* S.A., Arkaringa Creek.

POLLICHIA ZEYLANICA, *F. v. M.* S.A., on sandhills from Warrina to Everard. W.A., Cavenagh Range, near Barrow Range, and in many places in Victoria Desert.

HALGANIA CYANEA, *Lindley.* S.A., Cootanoorina; W.A., Skirmish Hill, Victoria Desert (Camps 42, 50, 54, 58), Fraser Range, near Gnarlbine, between Red Hill and Yilgarn; Von Treuer Tableland (D. Cumming).

HALGANIA LAVANDULACEA, *Endl.* W.A., 20 miles N.W. from Fraser Range.

HELIOTROPIUM EUROPÆUM, *Linné.* S.A., Warrina.

HELIOTROPIUM ASPERRIMUM, *R. Brown.* S.A., outskirts of Everard Range; W.A., near Mount Squires, Fraser Range.

HELIOTROPIUM TENUIFOLIUM, *R. Brown.* A paniculate form, W.A., Mount Squires.

EPACRIDEÆ.

LYSINEMA CILIATUM, *R. Brown.* W.A., between Red Hill and Yilgarn, near Mount Churchman.

CONIFERÆ.

CALLITRIS VERRUCOSA, *R. Brown.* S.A., 60 miles S.W. from Mount Watson. W.A., Victoria Desert (C. 41), 56 miles N.W. from Fraser Range.

Var. A. W.A., Victoria Desert (C. 62), 40 miles N.W. from Fraser Range.

Var. B. S.A., near Arcoeillinna. W.A., near Cavenagh and Barrow Ranges.

CALLITRIS ACTINOSTROBUS, *F. v. M.* W.A., 140 miles N.E. from Geraldton.

ORCHIDEÆ.

DIURIS EMARGINATA, *R. Brown.* W.A., between Red Hill and Yilgarn.

MICROTIS MEDIA, *R. Brown.* W.A., between Red Hill and Yilgarn.

An imperfect specimen of a *Thelymitra* also occurs in the collection from Victoria Desert (C. 57, 58).

IRIDEÆ.

PATERSONIA LANATA, *R. Brown.* W.A., between Red Hill and Yilgarn. A more silky form.

HÆMODORACEÆ.

ANIGOZANTHOS RUFA, *Labil.* W.A., between Fraser Range and Esperance Bay (Gwynne). Nearly as dark-flowered as *A. fumosa.*

LILIACEÆ.

DIANELLA REVOLUTA, *R. Brown.* W.A., Victoria Desert (C. 51), Fraser Range, and 56 miles N.W. of Quardanoolagin; Lake Darlot (D. Cumming).

WURMBSEA DIOICA, *F. v. M.* S.A., near Wa-wee Waterhole.

THYSANOTUS PATERSONI, *R. Brown.* W.A., Victoria Desert (C. 54), Fraser Range.

THYSANOTUS DICHOTOMUS, *R. Brown*, var. LINDLEYANUS. W.A., between Red Hill and Yilgarn.

This is the slender-branched form, kept specifically distinct by Endlicher; it agrees precisely with an authentic specimen from Preiss; no differences are observable in the seeds of this variety in comparison with the typic form; the root is not available for examination.

The collection contains also from the same locality a twining *Thysanotus*, not *dichtomus*, but the material is too imperfect for accurate naming.

CORYNOTHECA DICHOTOMA, *F. v. M.* W.A., near Barrow Range.

TRICORYNE ELATIOR, *R. Brown*, var. TENELLA. W.A., near Warangering.

STYPANDRA GLAUCA, *R. Brown*, var. IMBRICATA. W.A., Warangering.

Arthropodium Preissii, *Endlicher*. W.A., between Red Hill and Yilgarn.

Sowerbæa laxiflora, *Lindley*. W.A., near Warangering.

Bartlingia grandiflora, *F. v. M.*, var. paleacea. W.A., near Warangering; between Fraser Range and Esperance Bay (Gywnne); between Red Hill and Yilgarn.

Borya nitida, *Labillardière*. W.A., Karolin.

Xerotes fimbriatus, *F. v. M.* W.A., Victoria Desert (C. 59), between Red Hill and Yilgarn.

Xerotes leucocephala, *R. Brown*. S.A., 70 miles S.W. from Mount Watson; W.A., Victoria Desert (Camps 44, 61).

Xanthorrhœa Preissii, *Endlicher*. W.A., near Boorabin.

A variety with short fruiting spike, but with the robust stalk of *X. Preissii*: no leaves obtained.

Grass-trees with trunks up to 15 feet high were observed on sandhills in the Victoria Desert (C. 55).

FLUVIALES.

Triglochin calcitrapa, *Hooker*. W.A., near Mount Squires.

Triglochin centrocarpa, *Hooker* S.A., Upper Arkaringa Valley, Mount Ilbillee.

JUNCACEÆ.

Juncus pallidus, *R. Brown*. W.A., 20 miles N.W. of Red Hill. It is not easy to distinguish between *J. pallidus* and *J. communis*; but Professor Buchenan, the monographer of *Juncus* and *Luzula*, after lengthened study of the large Australian material submitted to him by one of us (F. v. M.), does not admit *J. communis* as a genuine Australian species.

RESTIACEÆ.

Lepidobolus Preissianus, *Nees*. W.A., Victoria Desert (C. 56, 57).

CYPERACEÆ.

Cyperus lævigatus, *Linné*. S.A., Nilpena, a slender form, with some of the spikelets solitary.

Cyperus vaginatus, *R. Brown*. S.A., Nilpena, near Mount Ilbillee.

Cyperus subulatus, *R. Brown*, var. confertus. W.A., Von Treuer Tableland (D. Cumming). The flower-bearing bracts are greyish, whereas in the plant from Alice Springs they are pale-brown. This has also some relation to *C. Gilesii*. As the typical plant is of littoral habit, it seems very doubtful whether the plant of the interior areas is actually the same. No ripe fruits are yet available.

CYPERUS IRIA, *Linné.* S.A., near Arkaringa Creek.

CYPERUS ROTUNDUS, *Linné.*. S.A., Warrina and Cootanoorina. The tunicate corms of this species are roasted for food by the aboriginals. The native name is *yalpa.*

FIMBRISTYLIS COMMUNIS, *Kunth.*, var. GRACILIS. S.A., Warrina to Cootanoorina.

SCIRPUS CARTILAGINEUS, *Sprengel.* S.A., between Red Hill and Yilgarn.

SCHOENUS APHYLLUS, *Boeckeler.* W.A., Victoria Desert (C. 56, 58). Stems finely, but distinctly, furrowed.

SCHOENUS HEXANDRUS, *spec. nov.*

Rather dwarf; stems very slender, smooth, but distinctly striated, leafless, except at the base; leaves rudimentary, compressed-subulate; cylindric petioles close, at the orifice densely barbellate; fascicles of spikelets capitular, solitary, terminal, small, often undeveloped; floral leaf solitary, diminished to a bract, provided with a barbellate clapsing stalk; spikelets few or several, small, ellipsoid-lanceolar; floral bracts about seven to nine, brown, with narrow pallid margin, glabrous, acutely pointed, usually one of the lower only maturing fruit; stamens six, all with very narrow anthers; stigmas much shorter than the style; hypogynous setules absent; fruit pale, orbicular-ovate, evidently compressed, devoid of lustre.

W.A., Victoria Desert (C. 57).

Stems numerous, variously less than one foot high. Spikelets one-quarter to one-third inch long. Fruit slightly pointed, scarcely one-tenth inch long.

This species is in its alliance nearest to *S. pleiostemoneus* and *S. deformis*, differing from both already in the inflorescence, in which respect our new plant is nearer to *S. aphyllus.*

SCHOENUS ARMERIA, *Boeckeler.* W.A., Victoria Desert (C. 58).

LEPIDOSPERMA LEPTOSTACHYUM, *Bentham.* W.A., Karoling.

LEPIDOSPERMA RESINOSUM, *Bentham.* W.A., Victoria Desert (C. 59).

LEPIDOSPERMA GRACILE, *R. Brown.* W.A., Fraser Range, Karoling.

LEPIDOSPERMA CANESCENS, *Boeckeler.* S.A., Mount Ilbillee, at 3,000 feet elevation, attains to rather above three feet high.

LEPIDOSPERMA VISCIDUM, *R. Brown.* W.A., 50 miles S.E. from Mount Churchman. (C. 93). The identical plant was brought from between Fraser Range and Esperance Bay by Mr. Dempster, and east of Ularing by Mr. J. Young. The plant varies much in height.

CAUSTIS DIOICA, *R. Brown.* W.A., 85 miles N.E. by E. from Esperance Bay (Gwynne); probably also Victoria Desert (C. 54), but only received in a flowerless state.

GRAMINEÆ.

Panicum leucophaeum, *H.* and *K.* S.A., Warrina, Arkaringa Valley, outskirts of Everard Range, near Ferdinand River.

Panicum gracile, *R. Brown.* S.A., Arkaringa Creek; W.A., Victoria Desert (C. 53); Bubba-ngundi Creek (D. Cumming).

Panicum effusum, *R. Brown.* S.A., Cootanoorina.

Panicum decompositum, *R. Brown.* S.A., Warrina, Arkaringa Creek, about Everard Range; W.A., Lake Way (D. Cumming).

Tragus racemosus, *Haller.* S.A., Cootanoorina.

Neurachne alopecuroides, *R. Brown.* S.A., outskirts of Everard Range; W.A., Victoria Desert (C. 58); Lake Way (D. Cumming).

Neurachne Mitchelliana, *Nees.* S.A., Upper Arkaringa Valley.

Neurachne Munroi, *F. v. M.* S.A., Upper Arkaringa Valley.

Erianthus fulvus, *Kunth.* S.A., Arkaringa Creek and Valley, Pernamo Hill.

Andropogon sericeus, *R. Brown.* S.A., Arkaringa Creek.

Andropogon exaltatus, *R. Brown* S.A., outskirts of Everard Range.

Andropogon bombycinus, *R. Brown.* S.A., Arkaringa Creek and Upper Arkaringa Valley; W.A., 25 miles N.E. from Fraser Range.

Anthistiria ciliata, *Linné.* W.A., near Lake Deborah.

Aristida arenaria, *Gaud.* S.A., Warrina to Everard Range; W.A., Victoria Desert (C. 53), Fraser Range; long. 121°, lat. 26° 31′ (D. Cumming).

Aristida ramosa, *R. Brown.* S.A., Cootanoorina.

Aristida calycina, *R. Brown.* S.A., Cootanoorina Creek, Arkaringa Creek, Everard Range. W.A., Victoria Desert (C. 10), Fraser Range.

Stipa elegantissima, *Labill.* W.A., Victoria Desert, (C. 61), Fraser Range.

Stipa setacea, *R. Brown.* S.A., Upper Arkaringa Valley; W.A., Victoria Desert (C. 53, 58), Fraser Range.

Stipa semibarbata, *R. Brown.* S.A., Upper Arkaringa Valley.

Stipa scabra, *Lindley.* S.A., Arkaringa Creek; W.A., Fraser Range.

Amphipogon strictus, *R. Brown.* W.A., Victoria Desert (C. 50, 53).

Pappophorum commune, *F. v. M.* S.A., Warrina to Arkaringa Creek; W.A., near Mount Squires, Fraser Range.

Sporobolus Virginicus, *H. & K.* S.A., Cootanoorina: W.A., Victoria Desert (C. 40).

Sporobolus Lindleyi, *Bentham.* S.A., Cootanoorina to Arcoeillinna.

Sporobolus actinocladus, *F. v. M.* S.A., Cootanoorina and Arcoeillinna.

Agrostis Solandri, *F. v. M.* W.A., Victoria Spring.

Eriachne aristidea, *F. v. M.* W.A., Skirmish Hill and near Mount Squires.

Eriachne scleranthoides, *F. v. M.* S.A., Upper Arkaringa Valley; W.A., Victoria Desert (C. 40).

Eriachne mucronata, *R. Brown.* S.A., near Ferdinand River, Pernamo Hill.

Danthonia bipartita, *F. v. M.* S.A., Arkaringa Creek and Upper Arkaringa Valley, near Ferdinand River. W.A., Victoria Desert (C. 51).

Danthonia penicillata, *F. v. M.* W.A., Fraser Range.

Astrebla pectinata, *F. v. M.* W.A., Von Treuer Tableland (D. Cumming).

Chloris acicularis, *Lindley.* S.A., Arkaringa Creek, near Mount Watson; W.A., Fraser Range; Von Treuer Tableland (D. Cumming).

Eleusine cruciata, *Lamarck.* S.A., Warrina to Upper Arkaringa Valley; W.A., Lake Darlot and Newland Range (D. Cumming).

Poa nodosa, *Nees.* W.A., Fraser Range.

Poa ramigera, *F. v. M.* S.A., 50 miles S.W. of Mount Watson; W.A., near Ernest Giles Range (D. Cumming).

Festuca scirpoidea, *F. v. M.* W.A., Elichaputten (C. 93).

Diplachne loliiformis, *F. v. M.* S.A., between Nilpena and Cootanoorina.

Diplachne Muelleri, *Bentham.* S.A., Cootanoorina.

Triodia pungens, *R. Brown.* S.A., Arkaringa Creek.

A variety remarkable for the bluntness of the lateral lobes of the grain-supporting bract.

Bromus arenarius, *Labill.* W.A., Victoria Spring, Fraser Range.

Eragrostis tricophylla, *Bentham.* S.A., near Mount Watson.

Eragrostis pilosa, *Palisot.* S.A., Cootanoorina to Arcoellinna.

Eragrostis eriopoda, *Bentham.* S.A., Upper Arkaringa Valley, outskirts of Everard Range; W.A., Fraser Range.

Eragrostis setifolia, *Nees.* S.A., Warrina to Arkaringa.

Eragrostis falcata, *Gaud.* S.A., Nilpena to Upper Arkaringa Valley.

Triraphis mollis, *R. Brown.* S.A., Warrina to Everard Range.

Triraphis bromoides, *F. v. M.* S.A., Everard Range W.A., Victoria Desert (C. 54, 57).

Agropyron scabrum, *Palisot.* W.A., Fraser Range.

RHIZOSPERMÆ.

Marsilea quadrifolia, *Linné.* S.A., Warrina; W.A., near Mount Squires, Fraser Range.

FILICES.

Ophioglossum vulgatum, *C. Bauhin.* S.A., near Wa-wee Waterhole, Yuluginna Hill (C. 4).

Cheilanthes vellea, *F. v. M.* S.A., Arcoeillinna Well, Turner Hill (C. 9); W.A., Cavenagh, Barrow and Fraser Ranges.

Cheilanthes tenuifolia, *Swartz.* S.A., Cootanoorina, Turner and Coffin Hills (C. 9, 12); W.A., Fraser Range, Lake Deborah, &c.

Grammitis Reynolsdii, *F. v. M.* S.A., Pingegurrinna Hill (C. 14), Birksgate Range; W.A., Cavenagh Range.

Grammitis rutifolia, *R. Brown.* S.A., Everard Range at 3,000 feet; W.A., Fraser Range, Lake Deborah.

Grammitis leptophylla, *Swartz.* W.A., Lake Deborah.

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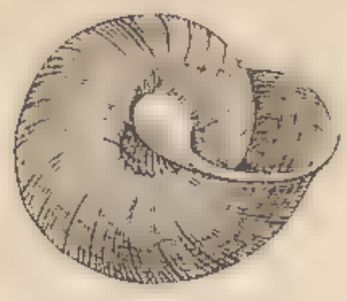
Plate I.

1ª



1ᵇ

1ᶜ

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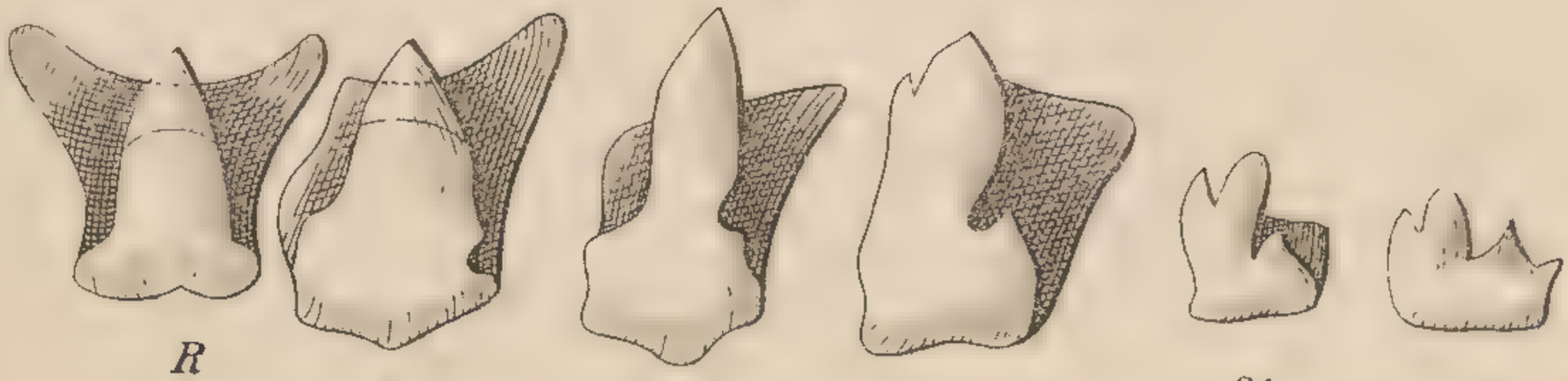


R 1. 12. 20. 24. 35.

H B. lith.

HUSSEY & GILLINGHAM LITH

PLATE II.

FIG 1.

Horizontal Scale : 16 miles, 1 inch.

Recent deposits. *Travertine.* *Granite.*

FIG. 2.

Granite. *Diorite.*

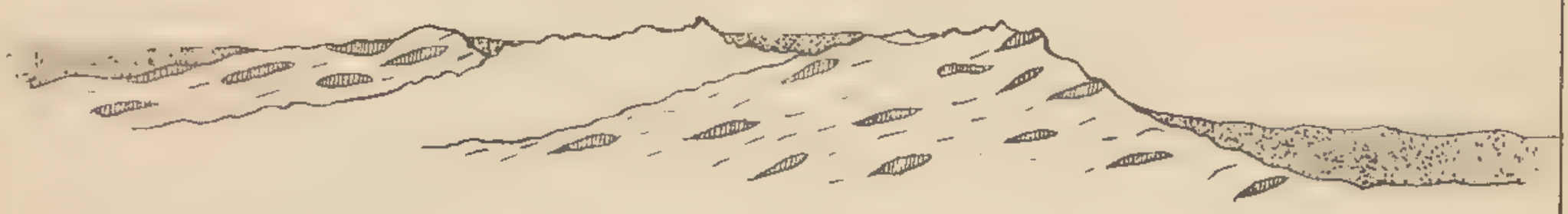
FIG. 3.

Scale : 16 miles, 1 inch.

Recent. *Sandstones and Grits.* *Granites.*

E.C.M

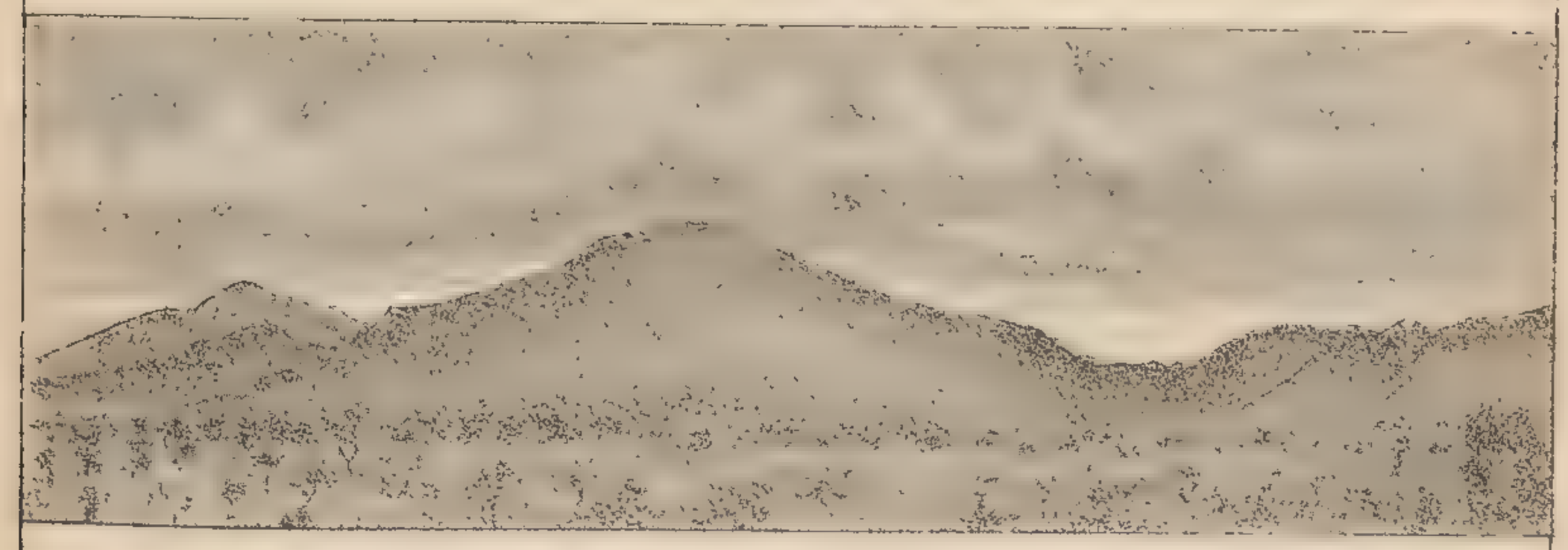
FIG. 4.



Sand. *Travertine with carbonaceous "eyes."* *Chalcedony.*

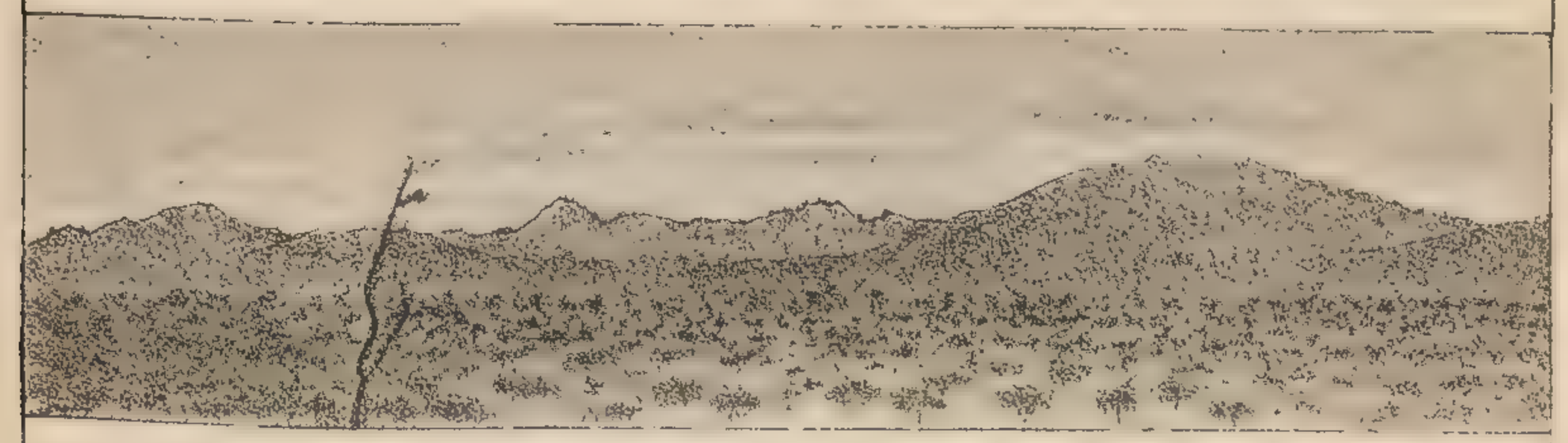
Scale : 24 ft., 1 inch.

FIG. 5.



Mt. Watson (Granite Range).

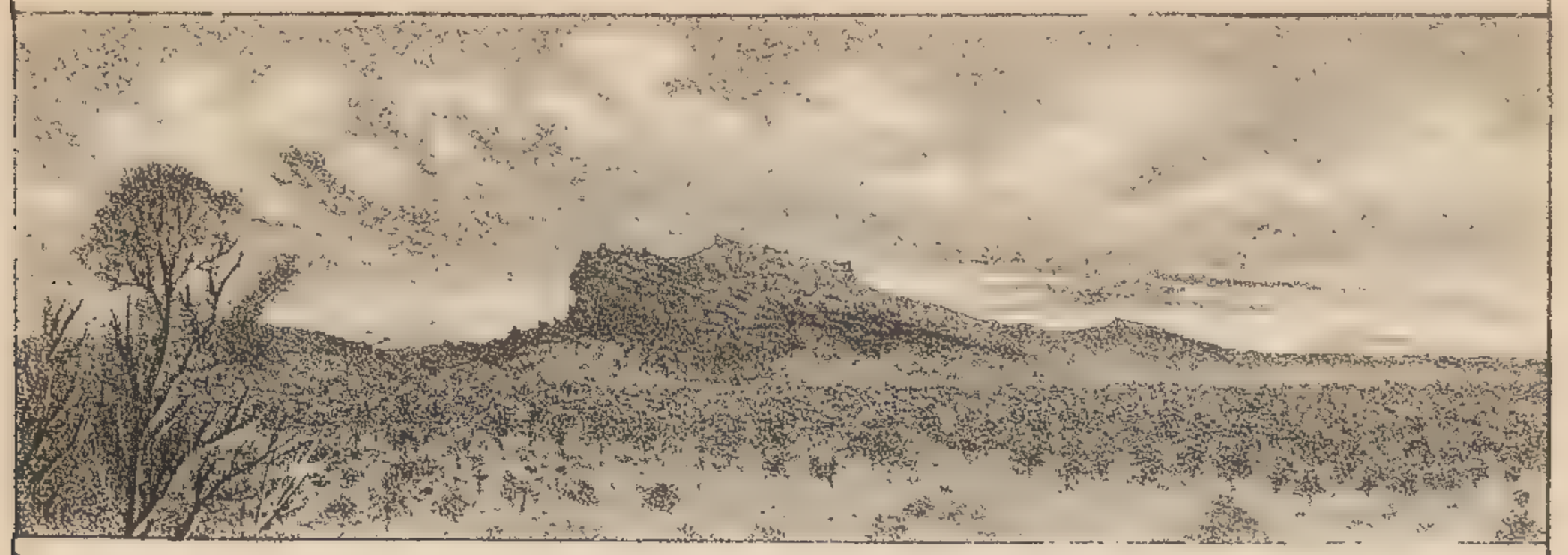
FIG. 6.



Birksgate Range (Granite).

E.C.M

FIG. 7.



Turban Hill (Marquee shape), Granite Range in background.

FIG. 8.

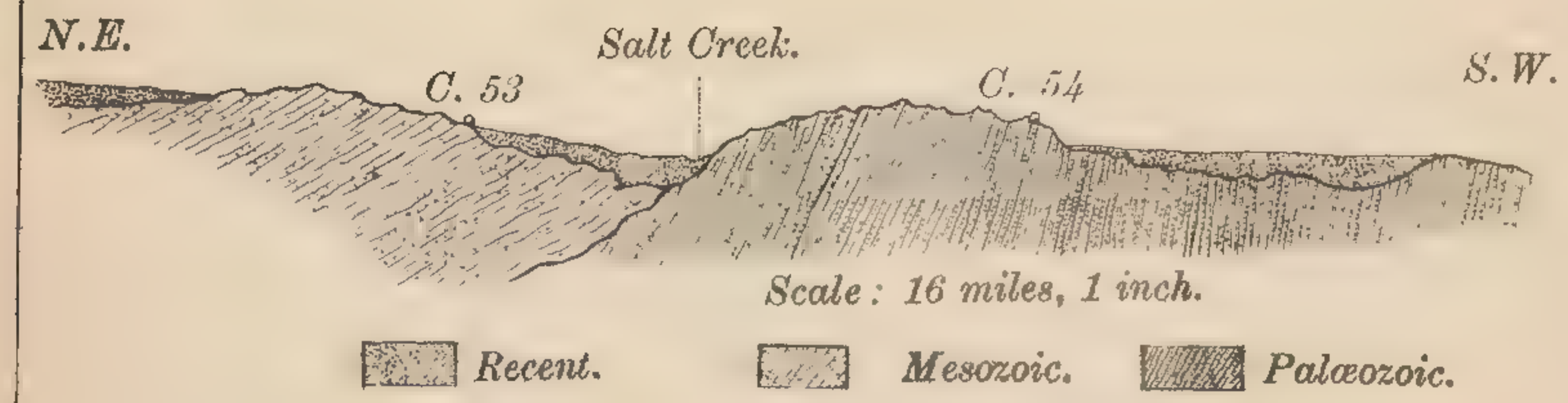
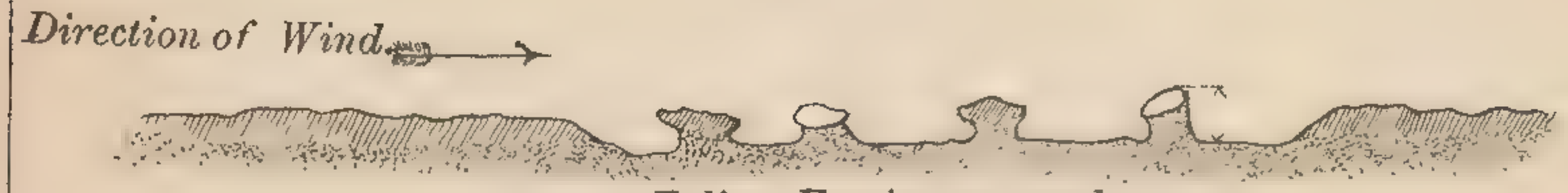


FIG. 9.



Æolian Erosion on sand.

FIG. 10.

Diagram of Sand-dune.

E.C.M

FIG. 11.

Queen Victoria Spring.

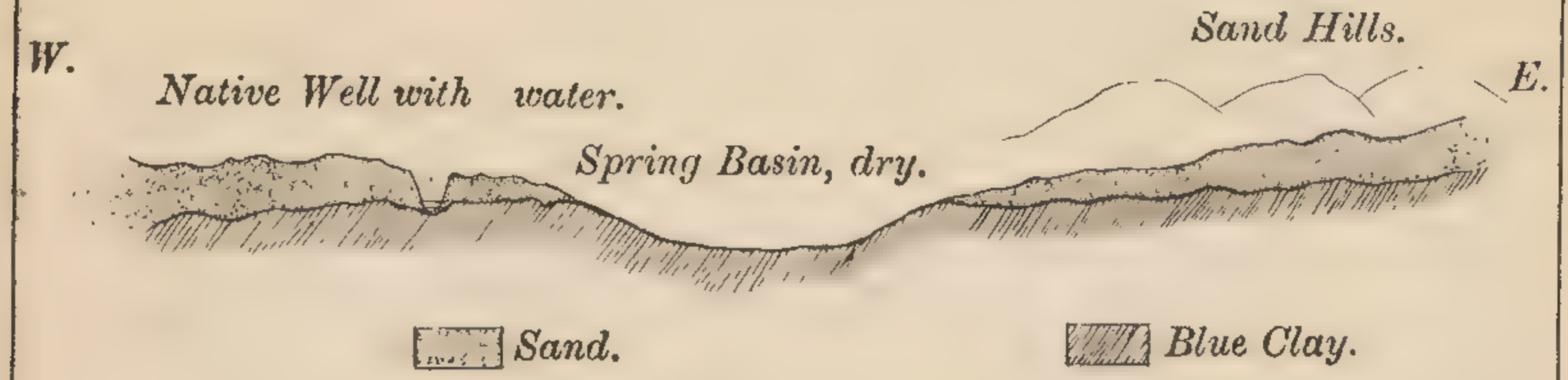


FIG. 12.

Scale: 24 miles, 1 inch.

Hornblendic schists. *Feldspathic schists.* *Siliceous schists.* *Recent.*

FIG. 13.

Granite Dykes at Fraser Range.

ECH

MAP

SHOWING THE

ROUTE TRAVELLED

BY THE

ELDER EXPLORING EXPEDITION

GEOLOGICALLY COLORED BY

VICTOR STREICH, Geologist to the Expedition.

Scale of Statute Miles

REFERENCE

- Recent and Tertiary
- Mesozoic
- Palæozoic (Devonian)
- Metamorphic
- Igneous

WESTERN AUSTRALIA

SOUTH AUSTRALIA

THE GREAT VICTORIA DESERT

GIBSONS DESERT

INDIAN OCEAN

SOUTHERN OCEAN

115° 120° 125° 130° 135° 140°

125° East Longitude from Greenwich

SKETCH SECTION FROM WARRINA TO ANNEAN STATION.

Compiled by VICTOR STREICH, Geologist to the Expedition.

Annean Stn. · Townsend Stn. · Lake Austin · W. Mt Magnet · S. · E. · Canning Hills · W. · N. W. · Mt Kenneth · Warrie Flats · Mt Churchman · Knutsford · S.E. · W. · Southern Cross · Karding · Yardanie · Charlbine · Depot Hill · Mt Monger · Lake Lefroy · Salt Lakes · E. · S.W. · Fraser Range · Salt Lake · Queen Victoria Spring · Loess · Salt Creek · Mound Spring · Mt Squires · Clay Pan · NE · N.W · Barron Range · Cavenagh Range · Skirmish Hill · Blyth Range · Mt Sir Thomas · Mt Watson · Birksgate Range · S.E. · S · N. · W · Ferdinand River · Mt Millaltee · Everard Range · Arcoellinna Well · Warrina · E. Peak · Sea Level

Horizontal Scale, 48 miles to 1 inch.

Vertical Scale, 200 feet to 1/6 inch.

VARDON & PRITCHARD GRESHAM-ST., ADELAIDE, LITHO.

1
1a.
2
2a.
3
3a.
4
4a.
H B lith

H.B. Lith.
1
2

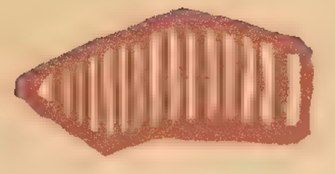
Boy; Fraser River Tribe.

Rock-paintings at Arcoeillina.

Rock-paintings near Wa Wee Waterhole.

Rock-paintings, Camp No. 12.

Plate X.



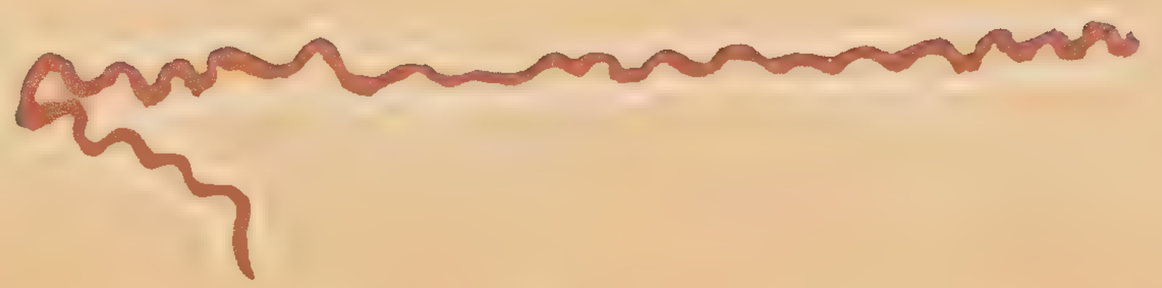
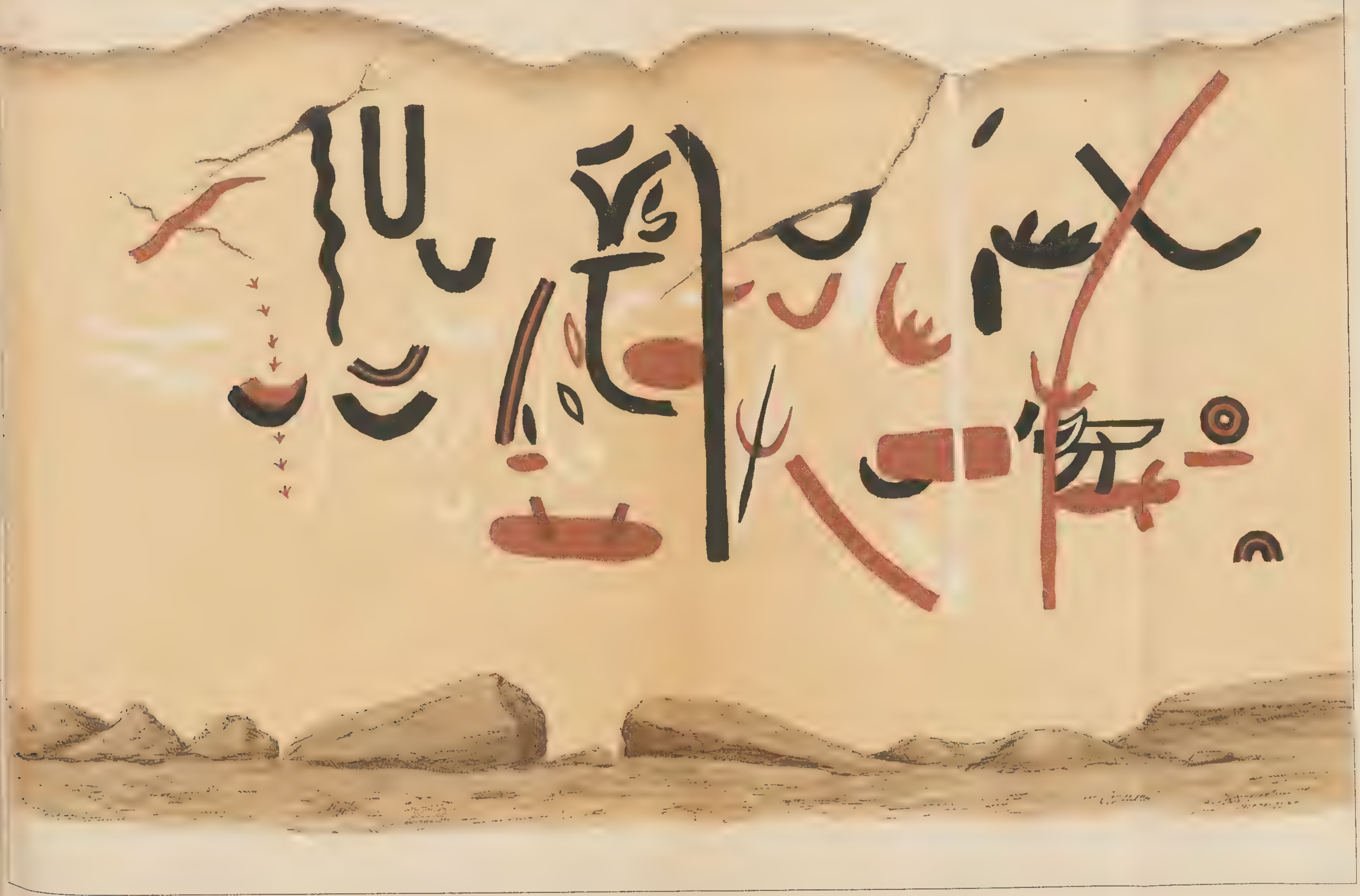


Plate XI.

Rock-paintings in Shelter near Mount Illbillie Soakage.

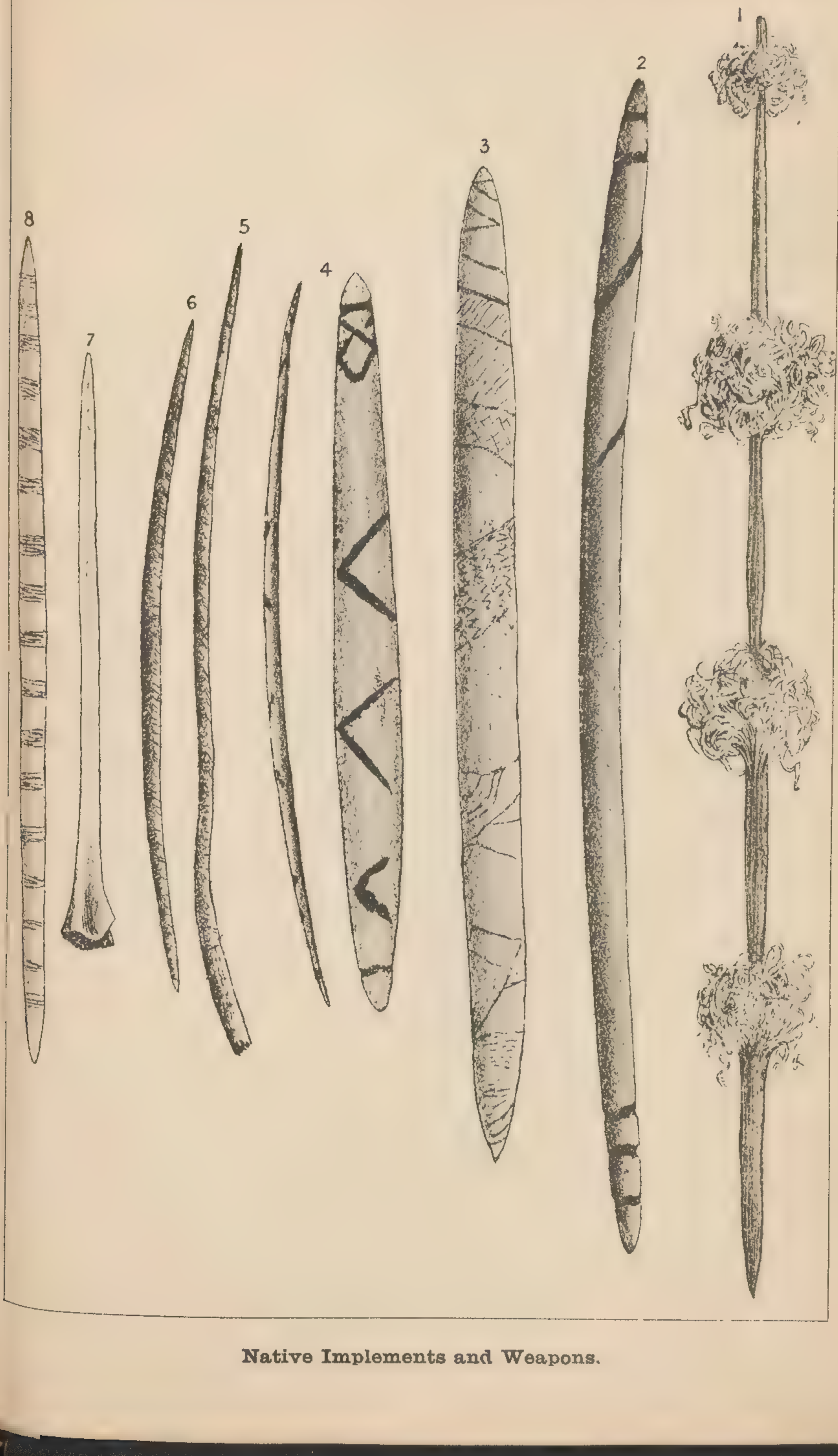


Rock-paintings about 30 Miles South from Camp No. 4.

Plate XIII.

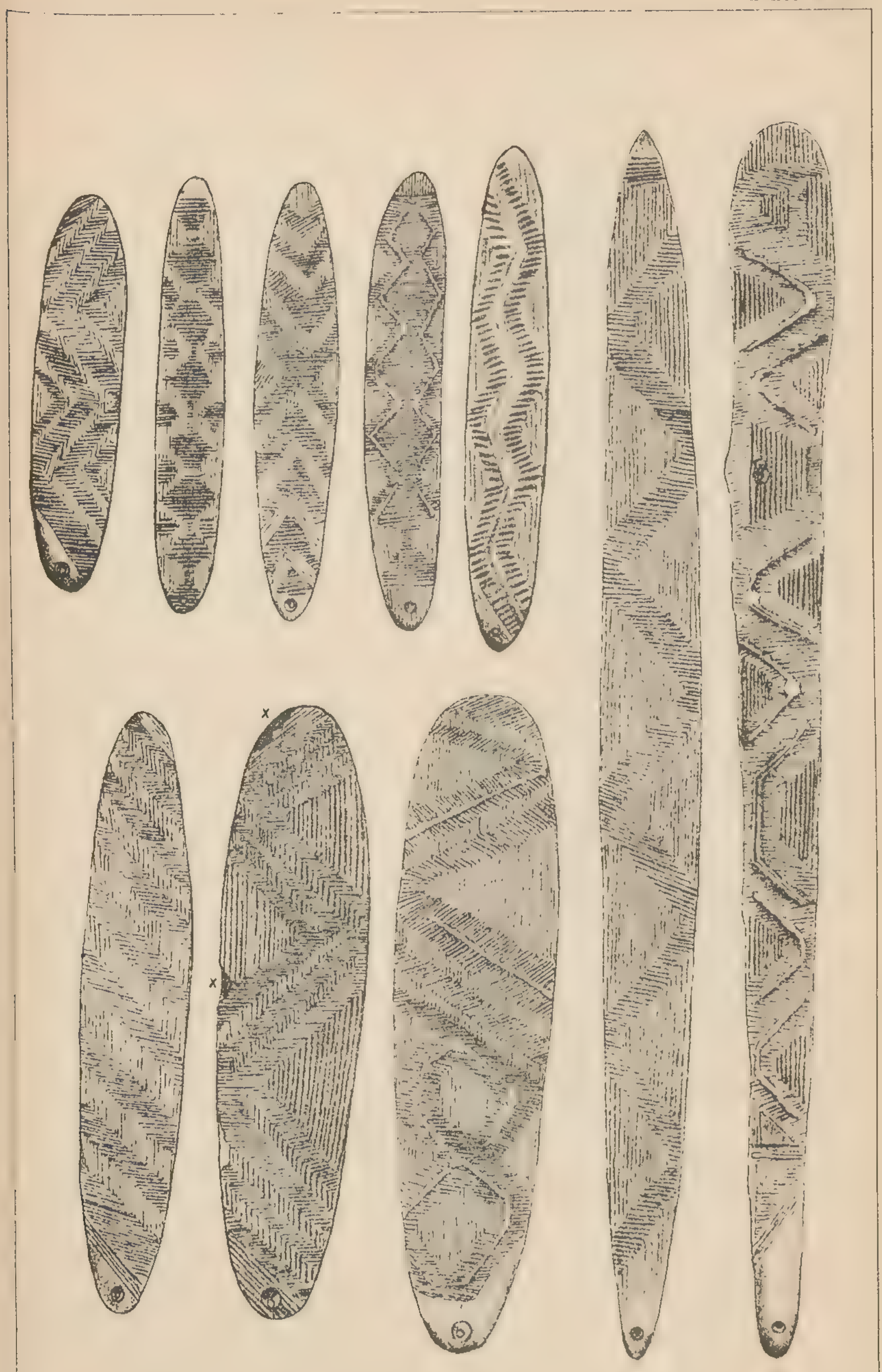
Rock-paintings about 5 Miles S.W. from Camp No. 5.

Native Weapons.

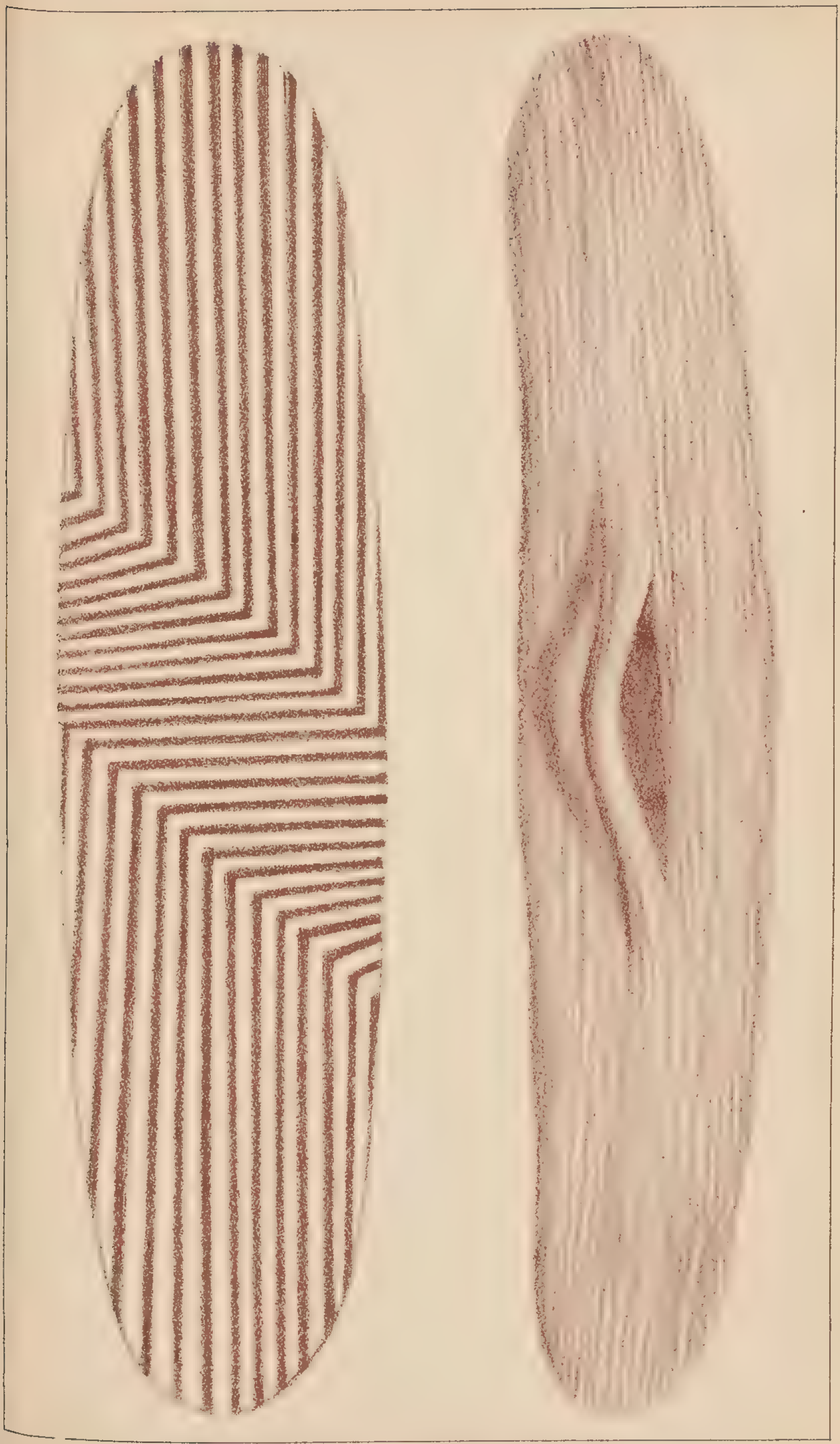


Native Implements and Weapons.

Native Weapons, &c.



Yilbars, Murchison District.



Native Shield, Murchison District.

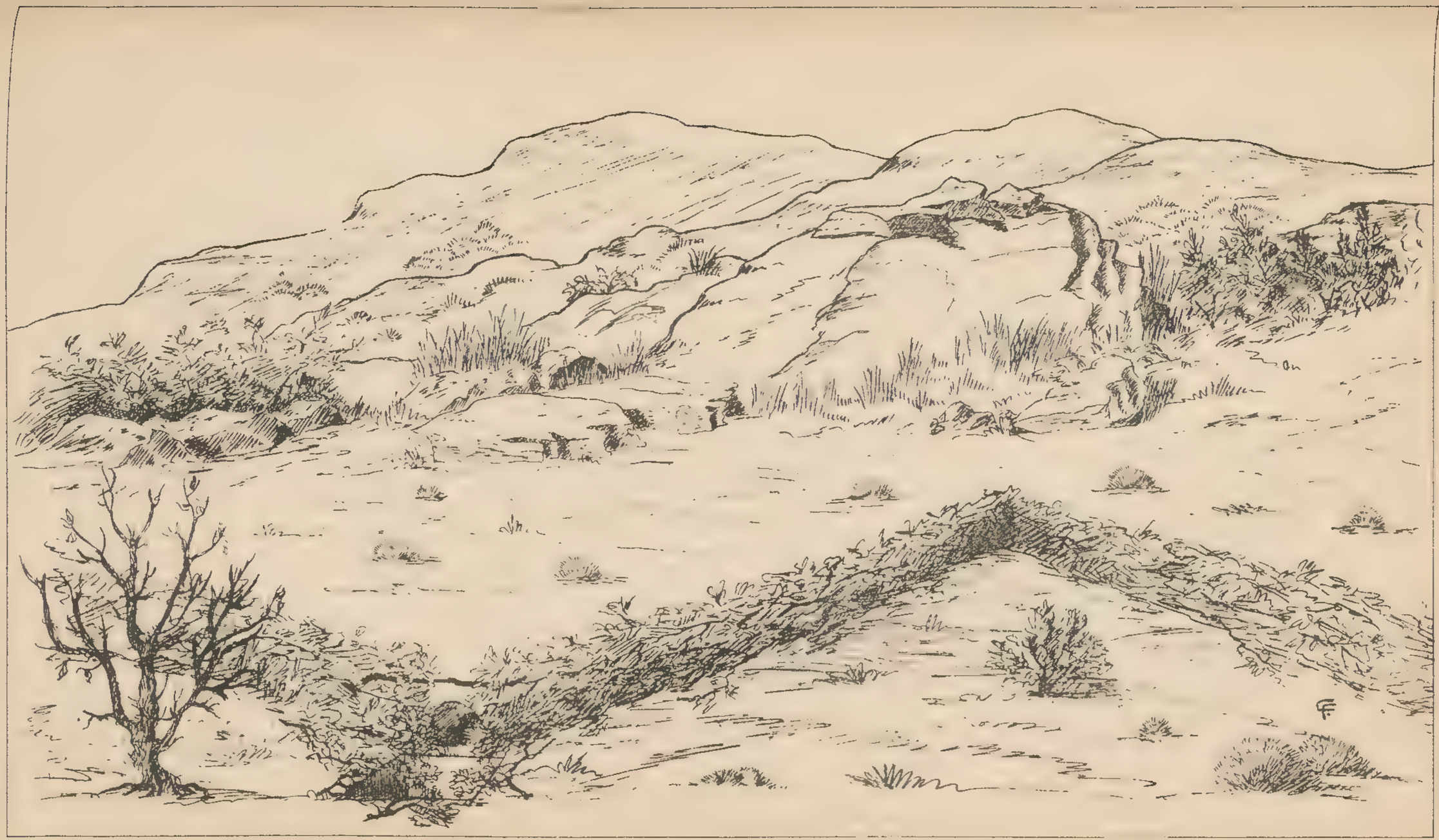


Plate XIX.

Native Trap for Game.

Plate XX.

Ornamentations on Chests of Natives.

Man of Everard Range Tribe, showing Hair tied up.

Man of Barrow Range Tribe, showing Chest Ornamentations. (Hair singed off in front.)

Man of Barrow Range Tribe, showing Chest Ornamentation. (Hair singed off.)

Man of Victoria Desert Tribe, showing Decorations.

Man of Victoria Desert Tribe, showing Coverings worn.

Man of Fraser Range Tribe, showing Fur of Animals' Tails in Beard and Hair.

Man of Fraser Range Tribe, showing Yundinga and Kondell.

Female of Fraser Range Tribe, carrying Child.

Plate XXIX.

Barrow Range Natives returning thanks for Food.

Three Everard Range Natives, showing roll of Native Tobacco on lips; also Wooden Mihas.

Plate XXXI.

Dwarfed Range Tribe—Three Young Men.

Blyth Range Tribe—Group of Men.

Blyth Range Tribe—Group of Men.

Fraser Range Tribe—Young Male. *Native engraving.*

Plate XXXV.

Fraser Range Tribe—Adult Male.

Plate XXXVI.

Fisher Range Tribe—Six-Legged Female.

Plate XXXIII.

Toungo Hausa Tribe—Group of Women.

Plate XXXVIII.

Hampton Plains Tribe –Mother and Son.

Plate XXIX.

SURVEYOR GENERAL'S OFFICE, ADELAIDE

Hampton Plains Tribe—Adult Male.

A VAUGHAN *Photo-Lithographer*

TRANSACTIONS

OF THE

ROYAL SOCIETY of SOUTH AUSTRALIA.

VOL. XVI., Part I.

EDITED BY PROFESSOR RALPH TATE.

[With One Plate.]

ISSUED DECEMBER 1892.

Vol. XVI. is reserved for the Scientific Results of the Elder Exploring Expedition, and the continuations of this part will be issued as the reports are received.

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W. C. RIGBY, 71, KING WILLIAM STREET.

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